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Shadow Graphic

Creating a dynamic typographic installation with shadows

A DISSERTATION PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN COMMUNICATION DESIGN

Author:
Milda Kuraitytė

President:
João Brandão

Examiner:
Jorge Reis

Supervisor:
Fernando Moreira da Silva

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Shadow Graphic project was a big challenge not only for me but for everyone who helped and worked with me. The tasks were complex and even simple exhibiting was hardly possible without help.

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"Design follows drama"
Marco Casagrande, 2011

Abstract

This research regards the creation of a typographic dynamic installation combining shadows with multimedia and representing Conflict. The installation expresses the various feelings associated with Conflict and allows the viewer to identify and interact with it.

The research begins from a non interventionist qualitative analysis and evolutes to an interventionist analysis.

We start this research with an analysis of the most appropriate ways to control shadows in order to express the desired conception. The challenges faced include creating clear and legible typographies from shadows and an appealing shape for the installation as a whole. We experiment with different concepts, materials and supports. As similar research projects point to the feeling of dynamic as a way of creating appealing installations, several ways of creating a feeling of dynamics are analysed and experimented. A fundamental tool for this was the use of a multimedia projection.

As part of our research we made three trial presentations where we collected feedback from the audience. The results and conclusions were used to modify our installation and this evolution is documented.

We conclude that it is possible and appealing to include dynamic while keeping legibility in the installation and that multimedia is one of the best ways to achieve this.

Keywords

Shadow, Installation, Typography, Multimedia, Dynamics, Balance, Conflict

Resumo

Esta investigação incide sobre a criação de uma instalação tipográfica dinâmica, representando o conceito de Conflito utilizando multimedia e sombras. A instalação expressa os vários sentimentos associados com Conflito e permite ao público identificar-se e interagir com esta.

A investigação começa com uma análise qualitativa não intervencionista seguida de uma análise interventiva.

Começamos esta investigação com uma análise das melhores maneiras de controlar sombras de modo a expressar a concepção desejada. Os desafios incluém a criação de tipografias claras e legíveis a partir de sombras e a criação de uma forma atractiva para a instalação. Experimentamos diferentes conceitos, materiais e suportes. Tendo em conta que projectos de investigação semelhantes apontam o sentido de dinâmica como uma maneira de criar instalações atrativas, vários modos de o fazer são analisados e experimentados. Uma ferramenta essencial para isto foi a utilização de uma projecção multimédia.

Como parte da nossa investigação fizemos três apresentações onde recolhemos feedback do público. Os resultados e conclusões foram utilizados para modificar a instalação e esta evolução é documentada.

Concluímos que é possível e atrativo incluir dinâmica sem perder legibilidade na instalação e que multimédia é uma das melhores maneiras de obter este efeito.

Palavras chave

Sombra, Instalação, Tipografia, Multimedia, Dinâmica, Equilíbrio, Conflicto

Accronyms

- AF - Adobe After Effects
- AI - Adobe Illustrator
- FAUL - Faculdade de Arquitectura - Universidade de Lisboa
- RGB - Red, Green and Blue
- TED - Technology Entertainment Design
- USB - Universal Serial Bus

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Introduction

Graphic design is one of the most popular branches of design nowadays. This popularity has led people to expect constant innovations from graphic designers and designers to try to create new possibilities within graphic design. Possibilities arise not only from new technologies but also from different approaches taken by the graphic designers. It seems clear that creativity and innovation is essential to keep the stimulus caused by their works.

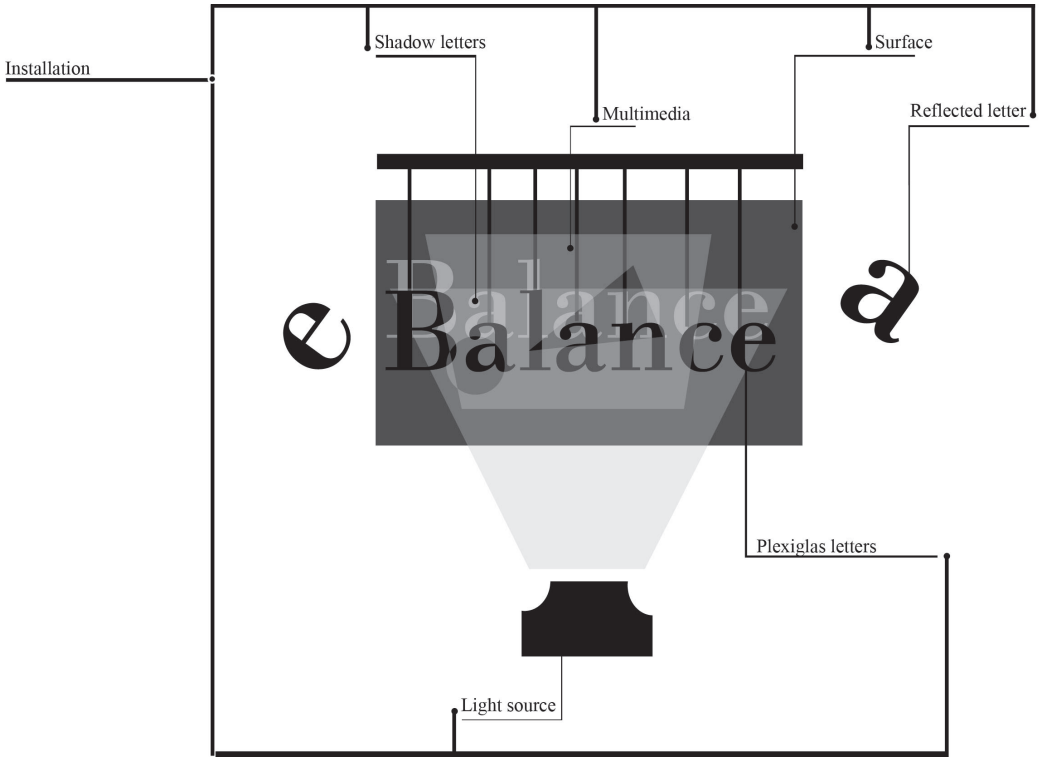
Glitchr, an artist who creates experimental typography using programming as a tool, is one of the examples. Another nowadays famous artist, Rafael Rozendaal, uses web pages as a canvas to create dynamic and interactive artworks. This experimental and conceptual approach to design can also lead to commercial success, exemplified by Rozendaal's Ford Fiesta.[1]

The desire to experiment and discover something new made us question whether there was some way of transmitting messages that justified making a research project about it. Following a minimalistic and modernistic approach, we came up with the idea of using a game of lights and shadows to transmit a typographic message created by an installation. To make it more appealing, thought of including a sense of dynamic in our installation.

This research is based on experiments which help us determinate the most appropriate ways to create our installation. We use a qualitative interventionist and non interventionist mixed methodology.

[1] `http://www.newrafael.com/art-car-project-for-ford/`

1.1 Scheme with common terms



We will mention the following seven key terms frequently.

- Surface
- Multimedia
- Shadow letters
- Plexiglas letters
- Light source
- Reflected letters
- Installation

Installation is the term used to refer to the set of the other 6 terms. **Plexiglas letters** are objects which project **shadow letters** on the **surface** behind them or on the **multimedia** projected on the surface. The shadows are projected with the help of a **light source** located in front of the Plexiglas letters. The Plexiglas letters reflect the light source creating what we call the **reflected letters**.

1.2 Problem and research questions

A general problem in graphic design is making sure that messages are transmitted exactly as we pretend them to be transmitted. Namely, a message should be

- clear
- legible
- appealing

These three characteristics of messages are difficult to balance. A clear and legible message is often not appealing and an appealing message is often confusing. When we deal with light, this is the main problem to face, creating an appealing message which is also clear and legible. There is a very thin line between a legible message and an illegible one. The materials used, the nature of the light sources and the features of the exhibition place affect the legibility. We are concerned with how dynamics will interfere with these characteristics. Our research questions therefore are

- Is it possible to create a dynamic light installation transmitting a clear and legible message?
- How does dynamic affect people's interaction with the installation?
- Should we impose a physical movement on the installation or create the illusion of dynamic?

1.3 Objectives

The objective of this work is to create a dynamic typographic installation with shadow. We set for ourselves the general and specific objectives described below.

1.3.1 General objectives

- Carry out an exhaustive analysis of other projects
- Experiment a large number of materials, shapes and light sources' setups
- Understand what are the best ways to create dynamic within the installation
- Create a clear, legible and appealing typographic shadow
- Create a supporting conceptual multimedia

1.3.2 Specific objectives

- Find a suitable form for the installation
- Create a concept for the written message and the multimedia
- Find a suitable exhibition place where to display the installation

1.4 Benefits

Using light in design offers a wide range of possibilities. Designers who would like to create projects using light as an element of their creations need to have access to studies about the components and results of other projects.

This project included an exhaustive analysis of the existing materials and how they can be used to transmit messages. This study will be helpful for anyone interested in the subject and willing to create a project on their own. It will save designers precious time in analysing, allowing them to concentrate on the concept of their project.

On the other hand, this project can be seen as an art piece. It is meant to be displayed and this means it has an artistic value.

1.5 Hypothesis

Dynamic makes the installation look more appealing and helps to capture the attention of the audience.

1.6 Research design

After choosing the field of study and the research area, we reached the step in which we need to select a theme. The theme should be relevant, innovative and exciting, not only to excite the audience but also the person who carried out the investigation, as it requires a lot of energy and enthusiasm. We chose to make a research on the theme of shadows with the title "Shadow graphic", subtitle "creating a dynamic typographic installation with shadows". At this point we were able to formulate the research question, which are the fundamental questions which we tried to answer during the study.

When we had clear questions to answer to, we set the hypothesis. The hypothesis is a result of our chosen theme and research question. It is a proposition but not a conclusion as it is set before performing the state of the art analysis and the active research. These were our expectations: later we evaluated our efforts and we checked if our hypothesis materialized.

We then began looking for sources and solutions in the section State of the art. This helped us to understand the existing situation and to discuss the similar projects. After getting familiar with the existing projects, we set new expectations for the project.

Active research is our experimental development, where we looked for ways to make the installation dynamic and appealing. The results obtained were evaluated by our sample groups which provided the feedback essential to interpret these results. From here we drew conclusions and understood whether our hypothesis stood the test. Following this step, we gathered a set of recommendations for future studies for people who will want to study the same or similar themes.

The methods used in this research are non interventionist qualitative methodologies, meaning we do not influence our elected sources. The only one step across the research where we have an impact on the results is the active research, when we perform experiments.

1.6.1 Scheme of research design

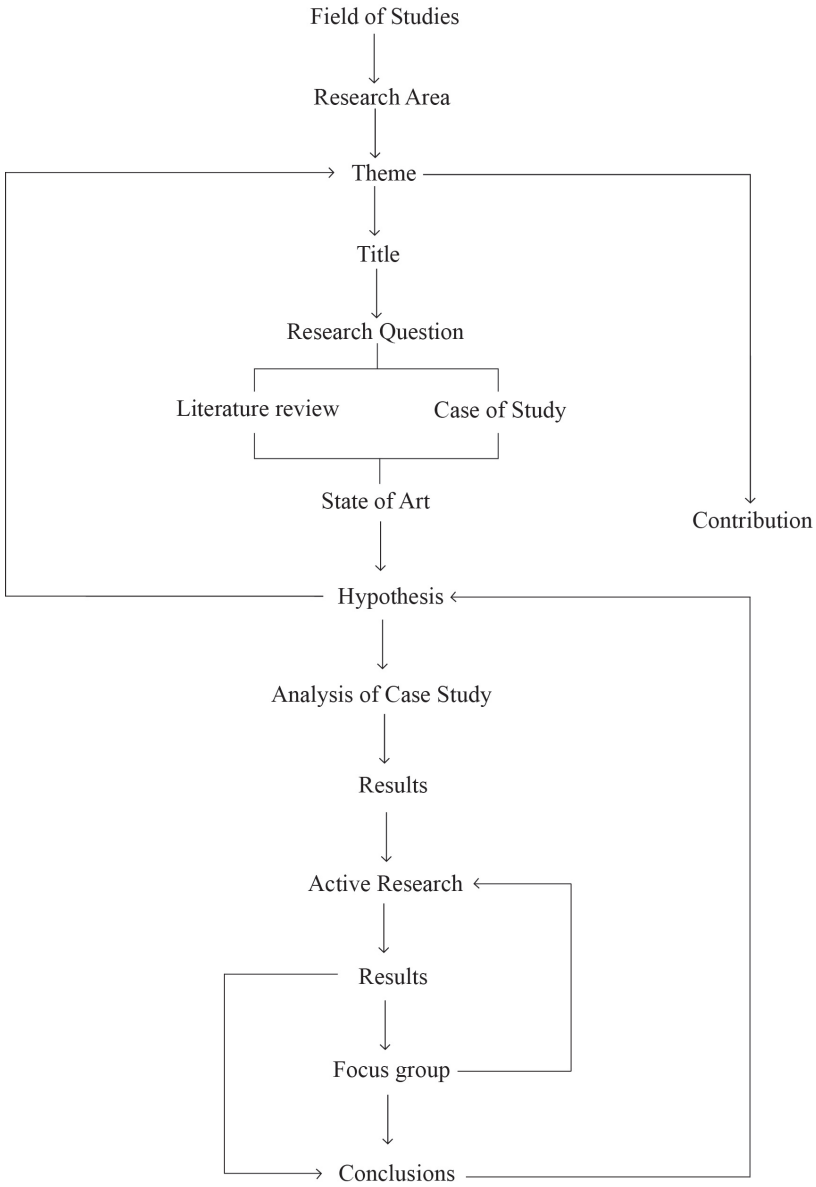


Figure 1.1: Scheme of research design

1.7 Synthesis

In this chapter we introduce the dissertation parts which are necessary for this dissertation project. We define our problems, research questions, hypothesis and objectives. Our research Questions are:

- Is it possible to create a dynamic light installation transmitting a clear and legible message?
- How does dynamic affect people's interaction with the installation?
- Should we impose a physical movement on the installation or create the illusion of dynamic?

These questions help us visualize on what direction we should focus our work. This way we developed our hypothesis:

- Dynamic makes the installation look more appealing and helps to capture the attention of the audience.

By trying to answer our research questions and to reach objectives we will see if our hypothesis will be proved.

State of Art

The state of the art section consists of two subsections, Literature review and Case study. These analyses helped us understand what kind of works have been done in this research area and served as inspiration on how to start the active research.

The Literature review is a short analysis of considerations by referential authors on the elements of our project and it was particularly helpful in the creation of the conception of the work. The Case study focus on already existing similar works. This analysis showed us some compositional and technical methods and contributed mainly to developing the visual part of work.

2.1 Literature review

2.1.1 Conception analysis

2.1.1.1 Shadow

The phenomenon of Shadow, like all natural phenomenon, has a strong symbolic meaning in our culture. This symbolic meaning can be found in folklore, literature, paintings and other kinds of art.

In Lithuanian folklore, which has a strong pagan background and is filled with superstition, shadow is a mysterious phenomenon symbolizing death. The 24th of December is a very important day because it is the shortest day in the year. In such a special and dark day, shadows play a very meaningful role: superstition says that when everyone is sitting near the table and you see one of the family member's shadow on the wall then that person will die soon.

One of the most famous interpretations of shadows on the wall comes from the famous Greek philosopher Plato's work "Allegory of the cave" [Plato, 1941]. Plato describes a group of people who live locked inside a cave all of their lives, facing a blank wall. They watch shadows projected on the wall by the things which pass in front of the cave and designate names to the shadows, which become the closest thing they have to reality. Plato compares the philosopher to a prisoner who is freed from the cave and realizes the shadows are not the reality. In this case shadow has a negative and symbolic meaning: shadows are a lie for the people, the world of unreal. Prisoners sit, look to the wall, and think that is the life. They do not have any idea that behind them there is real life where people live and do things. Plato seems to say that we live in a system we believe in, but that behind us there is someone who controls those shadows and so controls us. In the Allegory, the shadow in itself does not do anything bad, but it is a tool of the dark side which wants to fool people.

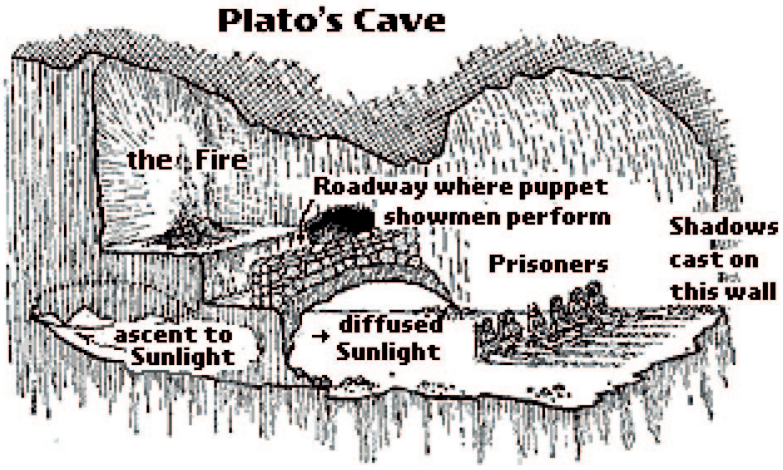


Figure 2.1: From Great Dialogues of Plato (1999, Warmington and Rouse, eds.) New York, Signet Classics: . p. 316.
`https://faculty.washington.edu/smcohen/320/cave.htm`.

Immanuel , a Prussian philosopher who is widely considered to be a central figure of modern philosophy, is famous for his quote "But only he who, himself enlightened, is not afraid of shadows" [Guyer and , eds.]. We can interpret that Kant wants to say that if you are educated and brave you should not be afraid of such a phenomenon and superstition such as a shadow and instead be ready to face it.

A Swiss poet, Johann Kaspar Lavater, says that, in the 18th century, artists were painting not faces but shadows of faces and that the shadow is a reflection of human soul [Shookman, 1993]. According to this thought we can think that shadows, our hard, obscure, mysterious traits, form our souls. It shows that to build the personality you need both "sugar and salt". It makes us worry and to think how much of our dark side and secrets we all have and how much people can see it in our faces. It suggests that shadow is something we should be afraid of, because we can explain it physically but philosophically it becomes more unclear. From the examples above we also

see that shadow is frequently used to transmit a message, either a prophecy or a reflection of the human character, but always in some mysterious way.

2.1.1.2 Dynamics

Dynamic, internal and external forces that operate movement in mechanical systems were first formulated by Isaac Newton in his research "Philosophiae Naturalis Principia Mathematica" [Newton et al., 1822]. However, human beings were using the principles of dynamic in art since they started painting. This can be observed in the paintings dating from 17000 years ago found in the Lascoux area. These paintings have a dynamic mood that our contemporary art standards understand; the technique of the paintings makes us to feel the different textures of the animals along with their movement. They make us to understand that dynamic is not just an object in movement, how Newton defined it, but the mood or illusion of movement too.

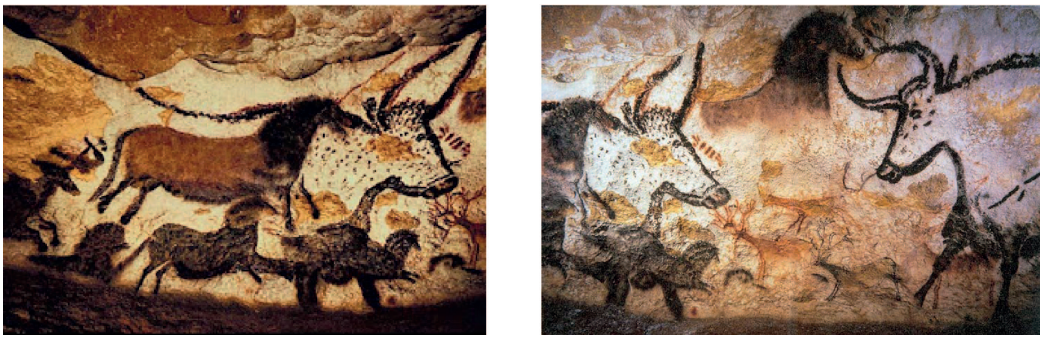


Figure 2.2: Unknown. *Untitled,* picture.
`http://commons.wikimedia.org/wiki/File:Lascaux_painting.jpg`.

Kinetic art is a an art style focusing on creating a dynamic or feeling of movement in the artworks. This is a very broad art style ranging several mediums. The Lascoux area paintings are one of the first examples of this. In the beginning of the 20th century, some of the most famous impressionists like Claude Monet, Edgar Degas and Edouard Manet were associated with kinetic art. Though they were expressing dynamics through human shape, this was a giant step in using dynamics in art.

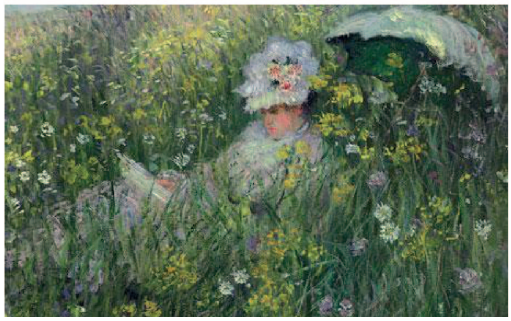


Figure 2.3: Top right: Degas, Edgar. *At the Races,* oil on canvas, 1877-1878 (Musée d'Orsay, Paris).
`http://en.wikipedia.org/wiki/Kinetic_artmediaviewer/File:Edgar_Degas_-_At_the_Races.jpg`.
Left: Manet, Edouard. *The Cafe Concert,* oil on canvas, 1878 (Smithsonian National Gallery of Art, Washington).
`http://www.dailyartfixx.com/tag/edouard-manet-birthday/`.
Bottom right: Monet, Claude. *Dans la prairié,* oil on canvas, 1876 `http://www.artflakes.com/en/products/claude-monet-dans-la-prairie`

Jackson Pollock is also known for making paintings using a dynamic technique. His technique, which got the name of "drip" , was described by Pollock as "a natural growth out of the need" [Boddy-Evans, 2014].


Figure 2.4: Left: Unknown. *Pollock is painting number 8,* picture, 1949 `http://histoire-art-roy.blogspot.pt/.`
Right: Pollock, Jackson. *Levender Mist,* oil, enamel, and aluminum on canvas, 1950 (National Gallery Art, Washington). `https://www.nga.gov/collection/gallery/20centpa/20centpa-55819.html.`

Soon enough, kinetic art evolved into actually using dynamic objects in the artworks. One of the pioneers doing this was Alexander Calder, who started experimenting with dynamics in his sculptures.


Figure 2.5: Left: Calder, Alexander. *Mobile,* Metal, wood, wire and string, 1932 (Tate, London).
`http://www.tate.org.uk/art/artworks/calder-mobile-l01686.`
Right: Calder, Alexander. *Untitled,* steel, 1937 (Tate, London).
`http://www.tate.org.uk/art/artworks/calder-untitled-t07920.`

Theo Jansen is another artist who became famous thanks to his kinetic sculptures. He has created large sculptures which move on their own. They are full of dynamic and they are gradually becoming less dependant on the artist. It is impressive to see how these "animals" walk and how its structure works in movement.


Figure 2.6: Jansen, Theo. *Starnbeets,* plastic tubes.
`http://www.strandbeest.com/.`

If we consider the quote usually attributed to the philosopher John A. Locke, "That which is static and repetitive is boring. That which is dynamic

and random is confusing. In between lies art." we can picture art as a balance between the static and the dynamic.

2.1.1.3 Balance

Balance is a popular concept in many subjects like religion, philosophy or even biomechanics. In the Aztec philosophy, balance was seen as the right way of living life, providing the necessary stability in an ever changing world [Maffie, 2005]. In biomechanics it is the ability to maintain the line of gravity and balance exercises are often used in physical therapy with patients who suffered strokes [Shumway-Cook A, 1988].

We live in times when healthy life style and emotional balance are desired characteristics. A person who cares about what he eats, does sports, takes care of his body and spends his free time learning something, investing in knowledge or in nature is a model of a perfected, balanced person, so it is natural that balance is often interpreted as a symbol of knowledge. As Turkish novelist Mehmet Murat Ildan said "Always seek for balance in your life: If you stayed long in the darkness, walk long in the light; if you talked too much, stay silent for a good while; if you climbed the high mountain, hike long on the plains! Balance is everything!" [Ildan, 2014]. To keep a balance is therefore to have knowledge and experience in knowing situations from opposite points of view. This way we can avoid becoming part of any side, as every time we touch something by ourselves we understand and we connect with it. Knowing two different sides makes us connected with both of the sides and therefore impartial. A person who understands advantages and disadvantages of both sides not only stays balanced but also can provide help with his knowledge and experience.

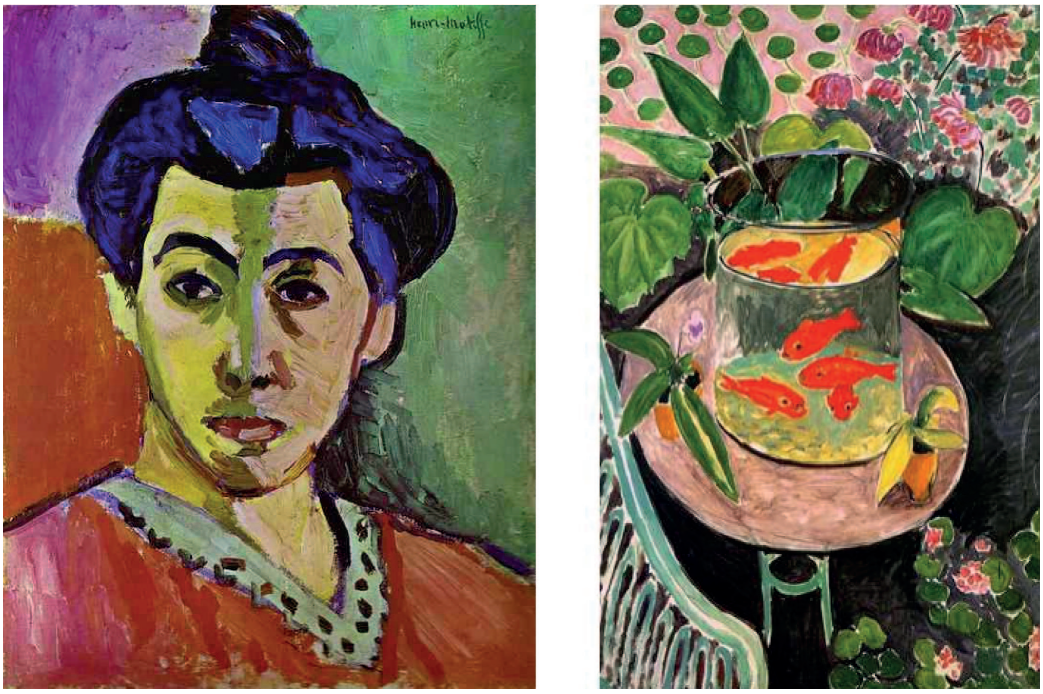


Figure 2.7: Left: Matisse, Henri. *Green stripe,* oil on canvas, 1905. `http://art2art.org.uk/blog/the-essence-of-an-object-the-role-of-memory.`
Right: Matisse, Henri. *Goldfish,* oil on canvas, 1912 (Pushkin Museum of Art, Moscow). `http://smarthistory.khanacademy.org/matisses-the-goldfish-1912.html.`

Artists have since long looked for balance as a land of perfection where things make more sense. Henri Matisse, who painted with balanced colours and simple shapes, once said "What I dream of is an art of balance" [Matisse and Flam, 1995]. This makes us think that it is hard to reach balance in art but that it is a dream for every artist. Why is it hard to reach balance in art? Maybe because art is so full of human emotion which is even harder to balance.

2.1.1.4 Conflict

One emotion known for every person is anger. Situations where anger takes power become conflicts. This negative characteristic is a very usual and common situation in human personality. As historian Hilaire Belloc said, "All men have an instinct for conflict at least, all healthy men" [Belloc, 2008]. Belloc seems to suggest that to have conflicts in life is not only normal but in some way necessary. Conflict most of the time appears when two sides do not agree in a particular question. Conflict also can be interpreted as a defence of the passions: not the most beautiful defence, but the most human. The scariest fact is that questions which opponents do not agree on sometimes are too serious and too sensitive, like those which involve innocent people. In human history, conflicts often grow to wars causing anger and instinct for conflict to grow with every generation.

Figure 2.8: Top left: Unknown. *First World War,* picture.
http://www.standard.co.uk/news/uk/
candlelit-vigil-at-westminster-abbey-will-start-first-world-war-centenary-event
html.
Top right: Unknown. *Second World War,* picture.
http://1.bp.blogspot.com/-EEf6W7QMdfI/U_5nE6nOIBI/AAAAAAAABB8/
0LW0mhFE9-g/s1600/WorldWar2art.jpg.
Bottom left: Unknown. *Untitled,* picture, 2014.
http://www.rfi.fr/europe/
20140220-ukraine-ianoukovitch-place-independance-berkout/.
Bottom right: Saber, Mohammed. *Untitled,* picture, 2014.
http://www.nytimes.com/slideshow/2014/07/22/world/middleeast/
20130723-ISRAEL-now.html?_r=0\#15.

Conflicts often grow to unbelievable destroying powers which we must control if we want to make sure we keep existing. Martin Luther King said that "Nonviolence is the answer to the crucial political and moral questions of our time; the need for mankind to overcome oppression and violence without resorting to oppression and violence. Mankind must evolve for all human conflict a method which rejects revenge, aggression, and retaliation. The foundation of such a method is love." [Bodhipaksa, 2007]

This inspires us to fight our most negative human characteristics with the most beautiful ones we have.

2.1.2 Design analysis

2.1.2.1 Legibility

Legibility is a measure of how well we can read and recognize individual characters in a message. Several factors influence the legibility of a message including

- the glyphs used
- whether it is a serif/sans serif typeface
- the letter contour
- the x-height
- the font weight
- the font height

We now explain what to these factors and how they influence legibility.

Figure 2.9: Expended Partition. *Maya glyph for Day 10 of the tzolkin calendar,* vector image.
`http://en.wikipedia.org/wiki/Glyph\#mediaviewer/File:MAYA-g-log-cal-D10-Ok.svg`.

Glyphs A glyph is an atomic symbol, one that has a meaning by itself and that cannot be further divided without losing it. Glyphs contribute to the meaning of the message they are contained in, though this contribution depends on the cultural and social context.

To better understand what a glyph is, we can take the letter "i" as an example. In the Latin alphabet, it is not a glyph because if we remove the dot we still recognize the letter "i" and know its meaning. However, in the Turkish alphabet, "i" is a glyph because if we remove the dot we get the letter "ı" which in Turkish has a different meaning than "i".

In order to understand a word we must recognize all its components. It is important to use only glyphs so that the audience can recognize them more easily.

Serif and Sans Serif typefaces Serif is the term used for a short line connected to a long stroke in a letter. So Serif typefaces refers to typefaces whose glyphs have a serif and Sans Serif typefaces are those whose glyphs do not have a serif.

Serif typefaces are considered more appropriate for printed material as the serifs in the bottom of the letters help constructing the line they are in, helping us to follow the text and avoid getting lost in the lines.

On the other hand, Sans-Serif typefaces present better legibility when read in computer screens. One of the reasons for this is that, due to resolution constraints, the serif is often hard to distinguish. Most web pages are done with Sans-Serif typefaces, though there are Serif fonts (eg. Georgia) which are specially designed to provide good legibility on computer screens by increasing the X height and using heavier serifs.

Figure 2.10: GFDL. *Serif and sans serif font,* vector image, 2007. `http://en.wikipedia.org/wiki/Serif\#mediaviewer/File:Serif_and_sans-serif_02.svg`.

Letter Contour Letter contour refers to the line setting the border between one letter and the other elements. This contour should be clear in order to provide good legibility. Causes for an inappropriate contour include:

- low resolution - when pixels are seen between the letter and the background
- badly chosen background - when the typeface and background colours are similar or when the background colour is too active the contour might become less clear
- size of the typeface - if the size is too little the space between characters also becomes too little so the contour becomes hard to see
- the print - bad printing or inappropriate paper might destroy the contour of the letter

X height X height is the term used to refer to the distance from the baseline to the mean line in a typeface, which usually corresponds to the height of a lower case "x". A badly chosen typeface destroys legibility so it is important to keep the proportion of the original typeface.

Figure 2.11: Naylor, Max. *A diagram showing terms to do with letter height and positioning on the baseline.,* vector image, 2007. `http://en.wikipedia.org/wiki/X-height\#mediaviewer/File:Typography_Line_Terms.svg`.

Font weight The weight of a font is a measure of its letters' thickness relative to their height. Too heavy fonts have bad legibility in part because the contour is destroyed. On the other hand, if a font is too light the contour becomes hard to read from a distance or even disappear when printed.

Figure 2.12: Froztbyte . *Font weight,* vector image, 2010. `http://en.wikipedia.org/wiki/Font\#mediaviewer/File:Helvetica_Neue_typeface_weights.svg`.

Font height Font height is the distance from the descender height to the ascender height. It is important not to choose a font height which is too little to distinguish the different letters.

2.1.2.2 Bodoni Typeface

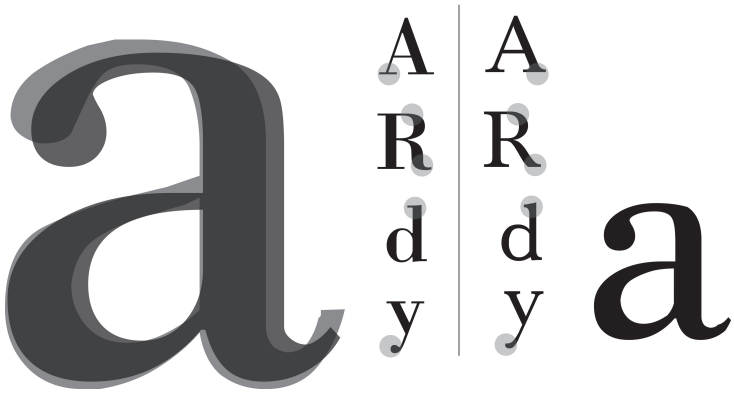


Figure 2.13: Bodoni vs Baskerville

Bodoni is a Romantic Serif typeface designed by Giambattista Bodoni in 1798 and based on the ideas previously developed by John Baskerville, namely an emphasis on stroke contrast and a more vertical and condensed upper case. These ideas were part of a 18th century movement that lead older font to be labeled simply old style. Giambattista Bodoni designed a simple and clear font, rejecting the so called old style.

Bodoni has been copied many times and has become a reference typeface. Giambattista Bodoni wanted his typeface to be read but also appreciated as a work of art which might be one of the reasons why it stayed relevant for such a long time. In fact, it started being used for book printing in the 18th century, was used for magazines in the 1960s and in the 21st century it is still used in fine book printing and advertising.

Nowadays, Bodoni faces some problems raised by technology. The extreme stroke weight contrasts and thin serifs affect its legibilities on low resolution screens.

2.1.2.3 Interactive Art

Interactive art refers to artworks where interaction with the audience is a vital part of the artwork itself. This interaction can take many forms and it has evolved greatly since it was first used until nowadays where technology keeps breaking barriers and allowing for further complexity.

Marcel Duchamp's installation Rotary Glass Plates, created in the 1920s, is often considered the beginning of interactive art. This installation requires the audience to rotate it and then step away from it. Standing from a distance it is possible to see the optical illusion designed by Duchamp. [Paul, 2008]

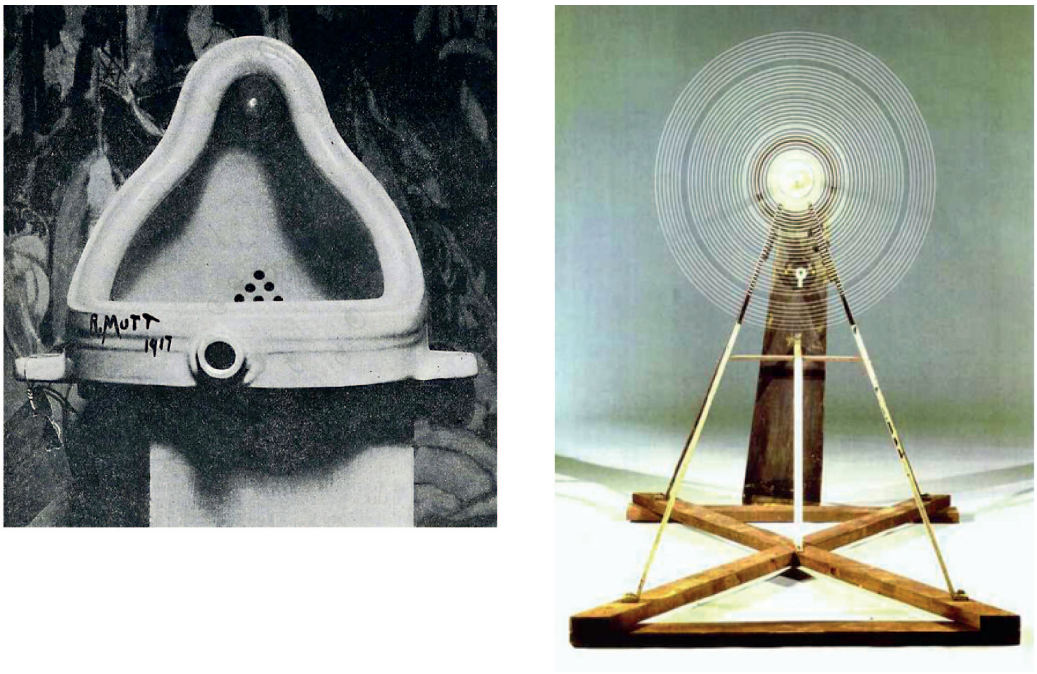


Figure 2.14: Left: Duchamp, Marcel. *Fountain,* Porcelain, 1917 (Tate, London). `http://www.thefirst10000.com/beyond-photography-marcel-duchamp-meet-brian-mccarty/`. Right: Duchamp, Marcel. *Rotary Glass Plates,* plates, metal axis, 1920 (Yale Center for British Art, New Haven). `http://www.marcelduchamp.net/Rotary_Glass_Plates.php`.

Installations have evolved since Duchamp and they are one of the best tools for Interactive Art. An important milestone are the installations of Roy Ascott, who created interactive installations in the 1960s. According to Frank Popper [Popper, 2007], "Ascott was among the first artists to launch an appeal for total spectator participation" when he presented his work "Change Paintings".

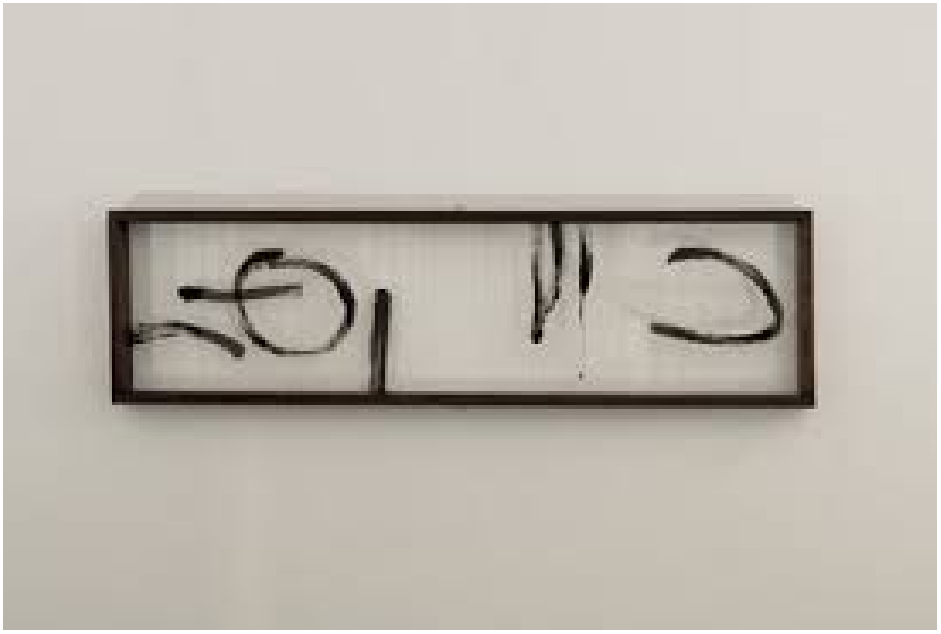


Figure 2.15: Ascott, Roy. *Change painting,* 1961. `http://farm4.static.flickr.com/3344/3407510584_07a8436018_m.jpg`.

In the 1970s there was a boost in installations popularity and artists started using new technologies like multimedia and audio. This popularity kept growing until the 1990s when entire exhibitions were dedicated to interactive installations. [Paul, 2008]

Figure 2.16: Left: Benayoun, Maurice. *The Tunnel under the Atlantic,* Virtual Reality, networks, video and audio communication, 1995. `http://en.wikipedia.org/wiki/Interactive_art\#mediaviewer/File:LE_TUNNEL_SOUS_L\%27ATLANTIQUE_(2).jpg`.
Right: Snibbe , Scott. *Boundary Functions,* interactive floor projection , 1998 (NTT InterCommunication Center, Tokyo). `http://en.wikipedia.org/wiki/Interactive_art\#mediaviewer/File:Boundaryfunctions_1.JPG`.

Nowadays one of the most popular tools for interactive installation is multimedia. Multimedia is a combination of animations, images, text, video, sound or interactivity. One of the reasons for this is the greater impact it has when compared with printed material. Another is the fact that it allows designers to create an interactive and dynamic interaction with the audience.

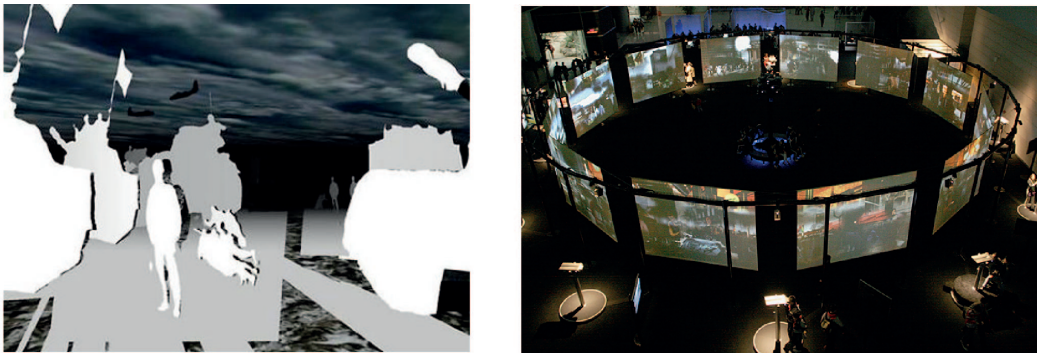


Figure 2.17: Left: Benayoun, Maurice. *World Skin ,* Virtual Reality Interactive Installation, 1997. `http://en.wikipedia.org/wiki/Maurice_Benayoun\#mediaviewer/File:Worldskin.jpg`.
Right: Benayoun, Maurice. *Cosmopolis ,* Virtual Reality Interactive Installation, 2005. `http://en.wikipedia.org/wiki/Maurice_Benayoun\#mediaviewer/File:COSMOPOLIS.jpg`.

2.1.2.4 Emotional Design

The topic of Emotional Design is analysed by Donald Norman in his book "Emotional Design: Why We Love (or Hate) Everyday Things" [Norman, 2007]. Norman analyses what is emotional design and how it works, saying "Cognition attempts to make sense of the world: emotion assigns value" [Norman, 2013].

Emotions are important as they improve our understanding and feeling of objects. Norman's quote means that emotional connection is important because that way we are happier to have those objects which appeal to our emotions.

In his 2003 TED talk [Norman, 2003], Donald Norman speaks about emotions and how they make our life better. Norman mentions that though design needs to have a function, it is when it also has some fun in it that it creates a better connection between the object and the person. Examples given include the "Juicy Salif" by the Italian company Alessi and created by French designer Philippe Starck. Donald Norman enjoys the design of this object and it makes him so happy, that this juicer is not in the kitchen anymore; it is in the entry way. In this talk he also mentions Google's decision on how to show pages in search results. He says that it is "funnier" to have systems likes this rather than simple numbering. At the same time he asks the audience if they have noticed it before. In his book he says "Good design is actually a lot harder to notice than poor design, in part because good designs fit our needs so well that the design is invisible." [Norman, 2013]

Figure 2.18: Google. *search icon,* vector image.
`http://en.wikipedia.org/wiki/Google_Search\#mediaviewer/File:Google_web_search.png`.

At the same time, when we speak about emotions regarding objects and happiness caused by them, we should keep in mind the quote by Francis Herbert Bradley, the British idealist philosopher: "The secret of happiness is to admire without desiring". [Coate, 2006]

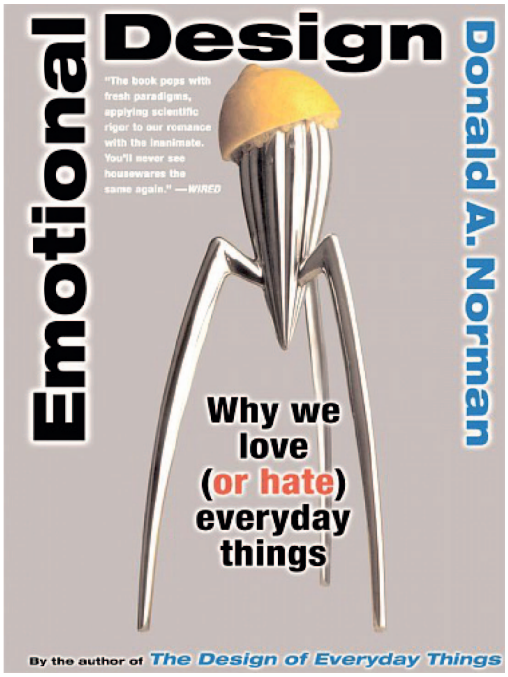


Figure 2.19: Left: Starck, Philippe. *Juicy Salif,* cast and polishedaluminum., 1990 (Museum of Modern Art. , New York). `http://introtodesign.blogspot.pt/2008/06/philippe-starck-juicy-salif.html`.
Right: Norman, Donald. *Emotional Design: Why We Love (or Hate) Everyday Things,* Book cover, 2004. `http://books.google.pt/books/about/Emotional_Design.html?id=h_wAbnGlOC4C&redir_esc=y`.

2.2 Case Study I: Shadow Typography

In this section we analyse existing similar works. To make the selection of which projects to analyse we chose the following criteria

- the work should be an installation with shadows
- the installation should have a typographic base

This method to choose the case studies, selecting criteria and after selecting already existing works which fit the criteria, make our case study a retrospective case study.

2.2.1 Analysis

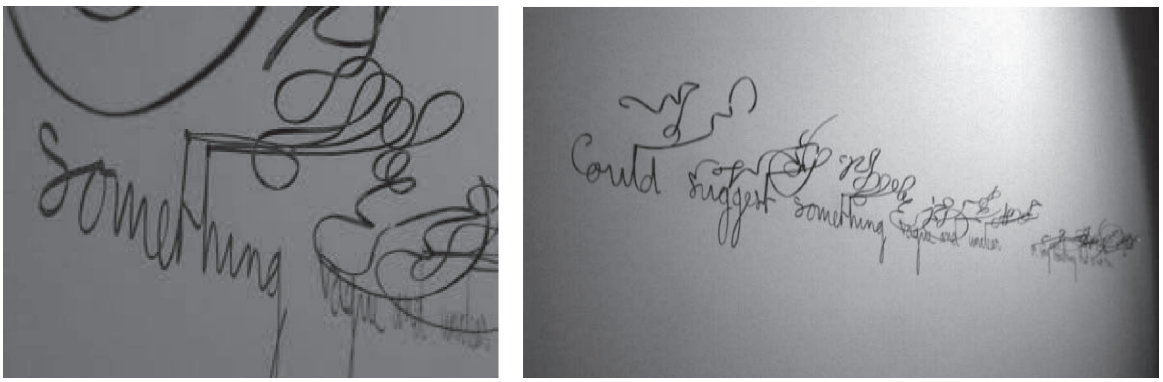


Figure 2.20: Analogue 1: Eerdekens, Fred. *Could suggest something,* copper, light source, 1999.
`http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 1

In analogue 1 the author uses a simple copper wire. When there is no light source, the copper wire presents a dynamic composition. When you direct a light source to the copper wire, it projects a shadow on the wall

behind it, creating a typographic shadow. This analogue was chosen because of the unexpected composition created by the light game.

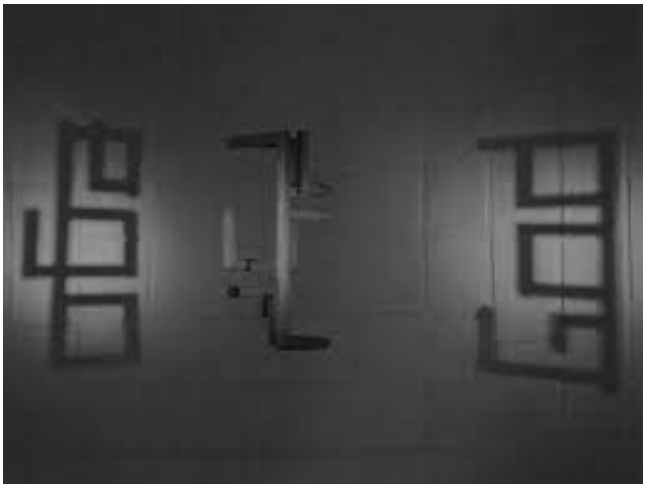


Figure 2.21: Analogue 2: Eerdekens, Fred. *God- Ego,* wood, two light projectors, 1990. `http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 2

There are two sources of light, so the object projects two shadows. Wooden composition is abstract. In the absence of adequate lighting object is simply an interesting composition. When there is light source, on the wall appear the terms "God"and "Ego ". Two light sources in a single composition create two different shadows. This analogue was chosen as an example of how one installation can make two shadows.

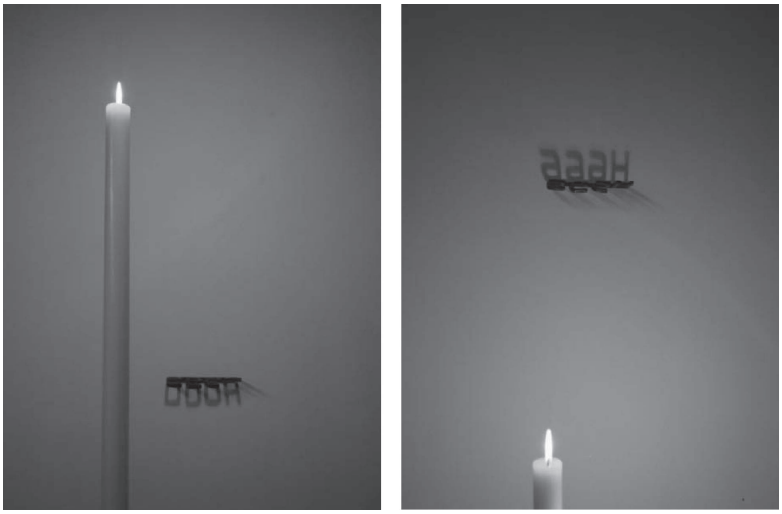


Figure 2.22: Analogue 3: Eerdekens, Fred. *Ooohaaah,* Bronze, candle, candle stick, 2004. `http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 3

We can see a horizontal composition, which, like the other analogues, without the light source looks like a modern art composition. The object projects a typographic shadow when you place a candle near at it.

Analogue was chosen because of the solution for the light source. When you illuminate the object from the top it creates a shadow with the term "Oooh" and when you do it from below it creates the term "Aaah". Changing the position of the light source allows for an object to create several different shadows.

Figure 2.23: Analogue 4: Eerdekens, Fred. *Men ga een zachter gang,* glass, steel, books, book covers, light projectors, 1999.
`http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 4

The composition creates a typographic shadow when you point light sources at it. The projected letters are not "shadow colour; they are formed from empty spaces between shadows. Shadows form the background and the letters are the empty spaces surrounded by shadow.

The installation was chosen as an analogue because of the possibilities of materials it presents. In this installation, existing objects like books are used and transformed to create new shadows. Another unusual fact about this installation is that the projected term is written using empty spaces between shadows and not the shadows themselves.

Figure 2.24: Analogue 5: Eerdekens, Fred. *Ecriture automatique,* Resin, pvc, water, light projector, 2010.
`http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 5

The used basis reminds of a bowl. Objects with the shape of letters are attached to the basis with an apparently random spatial ordering. However, when a light is projected on the letters, their shadows form a correctly spelled and typed typographic shadow on the wall behind. In this composition both the basis and the light source's shapes are part of the graphic elements of the composition.

The installation was once again chosen because of the contribution of the objects to the interaction between light and shapes.

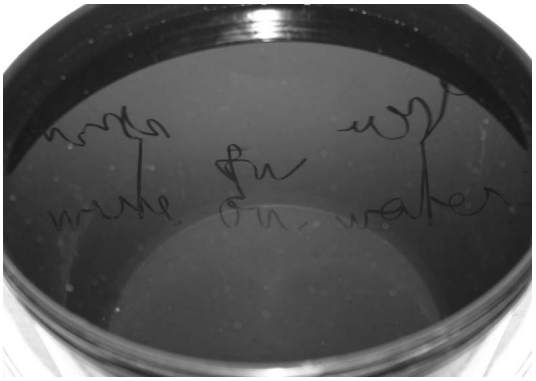


Figure 2.25: Analogue 6: Eerdekens, Fred. *Write on water,* Copper, wood, paint, water, 2011. `http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 6

Copper wire creates a font, which is reflected in the water. Copper wire composition is unclear and unreadable. When a light source is pointed to the water, the copper wire projects a shadow which spells the term "Write on water". This analogue was chosen for the interesting and peculiar choice for the "canvas" of the shadows.

Figure 2.26: Analogue 7: Eerdekens, Fred. *Tralalala,* Artificial trees, light projector, 1999. `http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 7

The object projecting a shadow is an artificial tree. The font is formed from the leaves of the tree. Pointing the projector, the projected font color is black, which creates legible letters. This is done by choosing the appropriate spacing between the leaves that are light in color. The analogue was chosen as it shows the possibilities of choice for the object which forms the shadow.

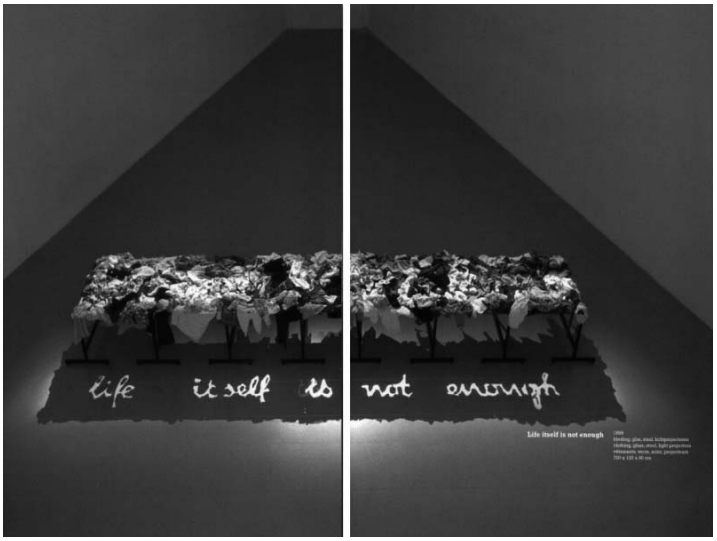


Figure 2.27: Analogue 8: Eerdekens, Fred. *Life itself is not enough,* Clothing, glass, steel, light projectors, 1999.
`http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 8

Clothes are arranged in a certain order so that the lighting from the top projects a typographic shadow on the ground. This analogue was chosen for the complex but interesting material used to create the shadow.

Figure 2.28: Analogue 9: Eerdekens, Fred. *Neo Deo,* Synthetic material, light projector, 2002. `http://www.fred-eerdekens.be/?page_id=19`.

Analogue Nr. 9

Imitations of clouds are hung. Their positions are carefully chosen so that, when a light source points at them, a shadow is projected on the wall, forming a font. This installation requires a very precise placing of the light source. This analogue was chosen because of the unusual using of the space of the installation.

Figure 2.29: Analogue 10: Eerdekens, Fred. *Twijfegrens,* Aluminum, steel, resin, 2011. `http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 10

A large scale installation. The composition projects a dynamic line on the floor using only natural light source. The object is exposed in open air and projects the shadow on the floor. This analogue was chosen as an example that using a natural light source is a real possibility.

Figure 2.30: Analogue 11: Eerdekens, Fred. *Outcut,* Mirror, light projector, 2010. `http://www.fred-eerdekens.be/?page_id=19.`

Analogue Nr. 11

A light source is pointed to the mirror projecting two shadows. A circle is cut in the middle of the mirror. The light source stands on top of the object. A white circle, surrounded by shadows, is formed under the mirror. Over the mirror the light is reflected creating a black circle, the only place where light is not reflected. This analogue was chosen because of the use of the mirror, a fundamental element in the light games. It shows the reaction of this material to the light.

Figure 2.31: Analogue 12: Yamashita, Kumi. *A to Z,* Carved wood, single light source, shadow, 2011.
`http://www.kumiyamashita.com/portfolio/untitled-a-to-z/.`

Analogue Nr. 12

We see scattered letters illuminated by a single light source on the right side of seen face. Without a light source, the letters form an interesting and seemingly random composition.

This analogue was chosen because it creates a feeling of a dynamic caused by the interaction between the layout of the letters and the position of the light source.

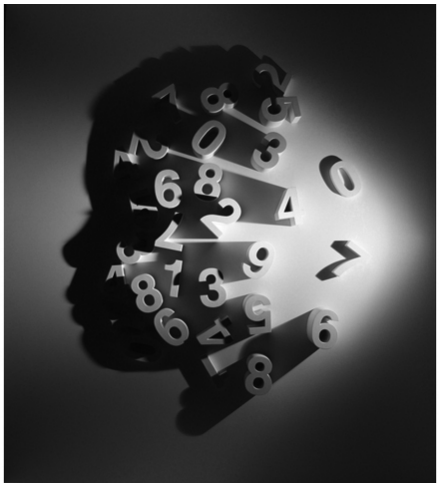


Figure 2.32: Analogue 13: Yamashita, Kumi. *Untitled Child,* Carved wood, single light source, shadow, 2011.
`http://www.kumiyamashita.com/portfolio/untitled-child/.`

Analogue Nr. 13

Randomly arranged numbers illuminated by a light source located on their right side. The projected shadow is the profile of a child. This analogue was chosen as an example of how static object can create a softly drawn silhouette. Inorganic objects can be used to project organic and warm shadows.

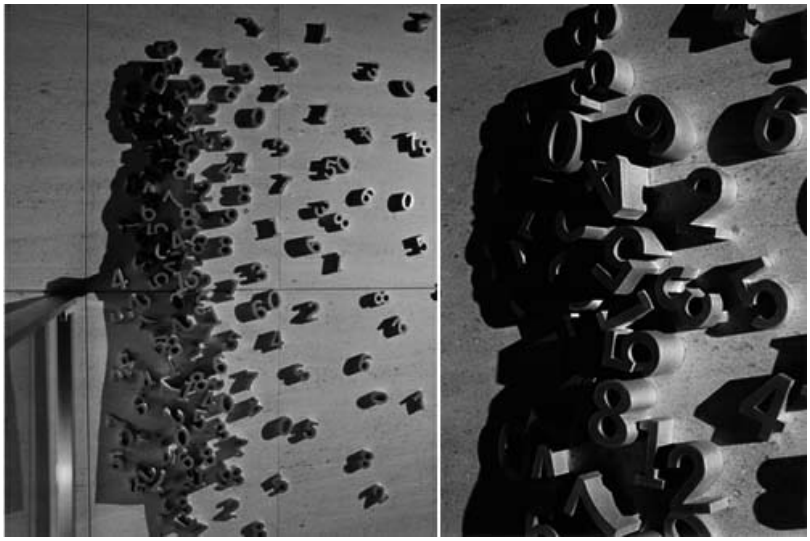


Figure 2.33: Analogue 14: Yamashita, Kumi. *City view,* Aluminium numbers, single light source, shadow, 2003.
`http://www.kumiyamashita.com/portfolio/city-view/.`

Analogue Nr. 14

Chaotic arrangement of aluminium numbers project a shadow of a woman‘s silhouette. The arrangement of the numbers is very dynamic while the projected shadow transmits a very static feeling. This analogue was chosen because it is a more complex installation comparing with the two previous examples, Nr 12 and Nr 13, as it is an effort to create a full body silhouette.

Figure 2.34: Analogue 15: Yamashita, Kumi. *Question Mark,* Stainless steel, single light source, shadow, 2003.
`http://www.kumiyamashita.com/portfolio/question-mark/.`

Analogue Nr. 15

A static exclamation mark is illuminated from the left side projecting a question mark on its right side. This analogue was chosen as an example of how a well known sign can project a completely different but related shadow, suggesting a philosophical reflection.

Figure 2.35: Analogue 16: Alakbarov, Rashad. *Crisis Haha* , old pipes, light source, 2009. `http://www.kurizutin.com/2012/11/shadow-and-light-painting.html`.

Analogue Nr. 16

Rusty old pipes are used to project an ironic and static writing on the wall. This analogue was chosen because it suggests that there should be a relation between the materials used and the ideas we want to transmit to people.

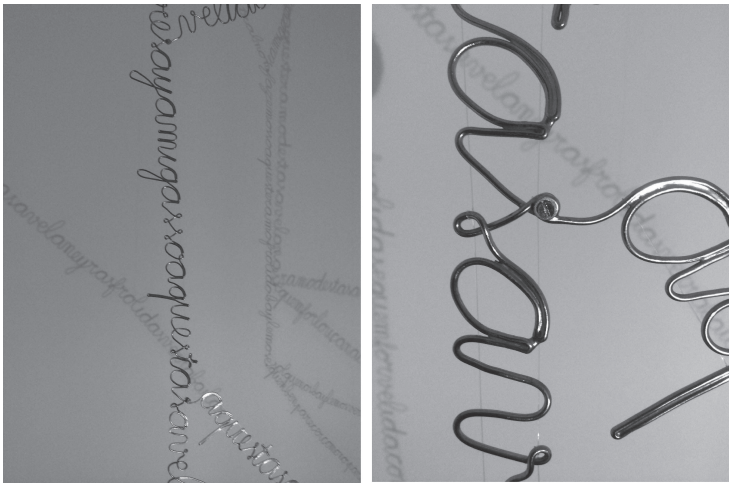


Figure 2.36: Analogue 17: Tavares, Salette. *Bailia de Ayras Nunos de Santiago, Três estrofes do poema,* chromed steel, 1979.

Analogue Nr. 17

Analogue 17 is artist Salette Tavares's interpretation of Ayras Nunes de Santiago's 13th century poem called Hazel-Tree ballad. The artist plays with the steel wired letters which are imitations of the three branches. She shapes the words with shadow as there is one direct light source in front of the installation. This Analogue has very special conception and is related to a poem which is mostly legible in the shadow letters.

2.2.2 Comparison

Analogues will be compared according to these elements

- Surface on which the shadow is projected
- Dynamics
- Font
- Light source
- Number of light sources
- Subject
- Texture
- Features of the exhibition place

Surface on which the shadow is projected

All analogues project a shadow into some surface. Analogues Nr: 1, 3, 5, 7, 9, 11, 12, 13, 15, 16 and 17 project a shadow on a plain surface. Analogues Nr: 2, 4 and 14 project a shadow on a non-smooth surface. Analogues Nr. 6 projects a shadow on water and Analogues Nr. 8 and 10 project it on the floor. We conclude that the shadows projected on plain surfaces are clearer and easier to read as it was the most used surface.

Dynamics

Analogues Nr 1, 10 and 17 have a dynamic line and font. Analogues Nr. 4, 9, 12, 13 and 14 have a dynamic composition. In analogue Nr. 6 there is a possibility of dynamics created by the space (as water is used as the surface where the shadow is projected, its unsuitability can create dynamics).

However, none of these projects creates dynamics or movement. The reason why dynamics in shadow graphics is not often seen might be the lack of legibility of the projected shadow.

Font

In analogues Nr. 1, 6, 8, 9, 10 and 17 free-hand writing is used. In analogues Nr. 2, 3, 4, 7, 12, 13, 14, 15, 16 a strict and static font is used. Analogue Nr. 5 is a correctly cut Serif font.

We can see that free-hand fonts are more popular and that strict fonts are used mostly with simpler compositions. The type of font used seems to be related with the mood the author wants to transmit. For example, in analogue Nr. 1 we read the text "Could suggest something"written in a light and free-hand way, clearly transmit- ting a different mood than in analogue Nr. 2 where we can read "God-Ego"written with a rigid and angular font.

Light Sources

All analogues use artificial light sources except for analogue Nr. 10 where a natural light source, the sun, is used. In analogue Nr. 3 the light source is a candle.

It seems to be more comfortable to use artificial light as you can control it better. This also gives you more freedom to choose the surface on which to project the shadow. Because artificial lights are less diffuse, they create more legible shadow letters.

Number of light sources

The number of light sources is very important when creating a composition as it directly influences the number of shadows projected by each object. In analogues Nr. 1, 3, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16 and 17 one

single light source is used. In analogues Nr: 2, 4 and 8 there are several light sources. In Analogue Nr. 2, two light sources project two different shadows.

It seems to be more popular to use one single light source.

Subject

In analogues Nr. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 16 a typographic shadow is projected and the subject is usually a catch phrase. The used font is directly related with the subject, helping to define both the subject and the mood. As an example, in analogue Nr. 11 a circular shadow is projected, creating a static and modern mood. As for analogue 17, the full text of the poem is used and in this way the artist interprets folklore and interacts with the audience.

Texture

None of the analogues presents a shadow with a texture. It seems that this is a complicated thing to do.

Features of the exhibition place

In analogue Nr. 9 the composition interacts with the features of the exhibition place. Analogue Nr. 14 is exhibited in a balcony, and the author uses the balcony's handrail as a part of the composition. A carefully planned usage of the exhibition places might allow us to create dynamic and mood.

Conclusions

All analogues have been carried out using different techniques, materials and light source positions. However, all the analogues have a common feature: without the correct light source there is a part of it which is not visible. Only with the right light source is it possible to get the principles and goals of the installation.

2.3 Case Study II: Balance in Painting

Analysing world famous artists' works related with the topic of balance helped us understand not only the interpretation of the concept of "Balance" but also the visual techniques used to express it.

We chose to analyse two paintings with the topic of "Balance". The fact that it was possible to see these works live at Museu Berardo in Lisbon also motivated our choice.

2.3.1 Francis Picabia

Francis Picabia (1879-1953) was a French avant-garde painter. He was one of the early major figures in the Dada movement in United States and in France. At the time Francis Picabia was interested in Dada, he created his work "Balance", shown below.

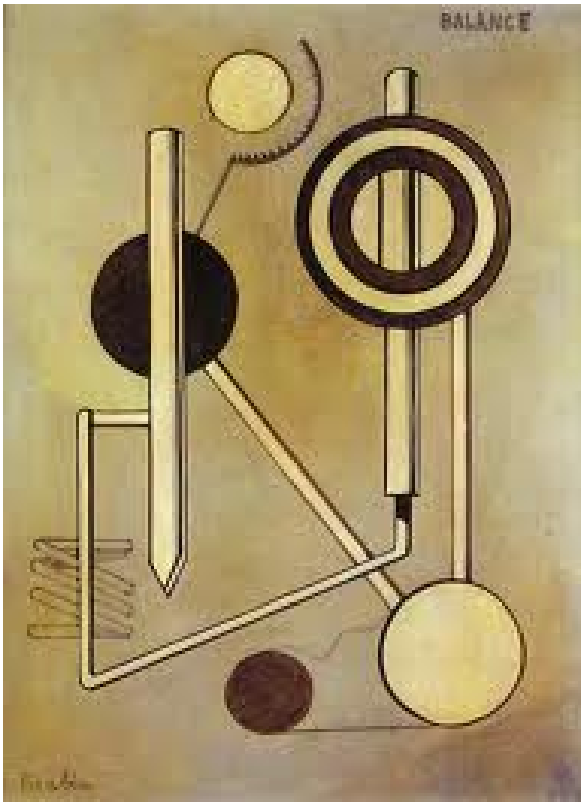


Figure 2.37: Picabia, Francis. *Balance,* oil on canvas, 1919 (Centro Cultural de Belém, Lisbon).
`http://uploads2.wikiart.org/images/francis-picabia/balance.jpg`.

- Artist: Francis Picabia
- Completion Date: 1919
- Style: Dada
- Genre: figurative painting
- Technique: oil
- Materials: cardboard
- Dimensions: 60 x 44 cm
- Gallery: CCB

"Balance" is a figurative painting made in Dada style. Though it may look abstract or non-representational, after knowing the title we can understand and interpret what is happening in the painting, which reminds a mechanism taken from an industrial machine. Balance in this case is a description of status, the status of the figures in this position: they all depend on each other and together they create balance. There is a feeling of stillness. The circles look frozen in their movement as well as all the tubes. Balance is this moment of quiet and peace.

Formal qualities of painting.

The black line, which is present in all the components, is central in this composition, creating the impression of a one line drawing. This impression is even stronger because of the brushwork, which is careful, without textures or unexpected expressions, monotonic and minimalistic. This monotonic and minimalistic feeling is increased by the warm pallet with light, sandy and pastel colours.

Comparing circles and tubes we see that the circles have much more "weight" than tubes. This might give the impression that tubes are just elements used to connect and keep circles in balance.

The work does not have a perspective and it is strictly constructed. There are two plans: in the first one there is all the construction and in the second there is a small industrial detail.

The composition is central and balanced. The artist placed his signature in the left lower corner and the name of the painting in the upper right corner, as a way to keep balance in both corners, emphasizing the concept of the picture.

Francis Picabia was also experimenting with impressionism, pointillism, cubism and even surrealism. He has many different works with different styles. The work "Balance" is an unusual work for Picabia, who often depicted human shapes and contrasts between colours. In "Balance" we see a very different personality of Picabia.

When the painting was done, in 1919, only a few months had passed since the end of World War I. This was a period when balance came back to people's life, simultaneously very still and dangerous, as the painting. Why dangerous? As we mentioned above, all the details in the painting are so interconnected and dependant on each other that even one gust of wind could destroy everything. The same situation was happening in reality; everyone needed to be careful not to provoke another war. The constrictive composition, similar to an industrial machine, also reminds the First World War, famous for the new technologies used. Francis Picabia's work "Balance" was a wonderful inspiration for shapes associated with the word and conception of balance.

2.3.2 Jean Hélion

Jean Hélion (1904-1987) is a French abstractionist painter and a leading modernist who was working with figurative painting.

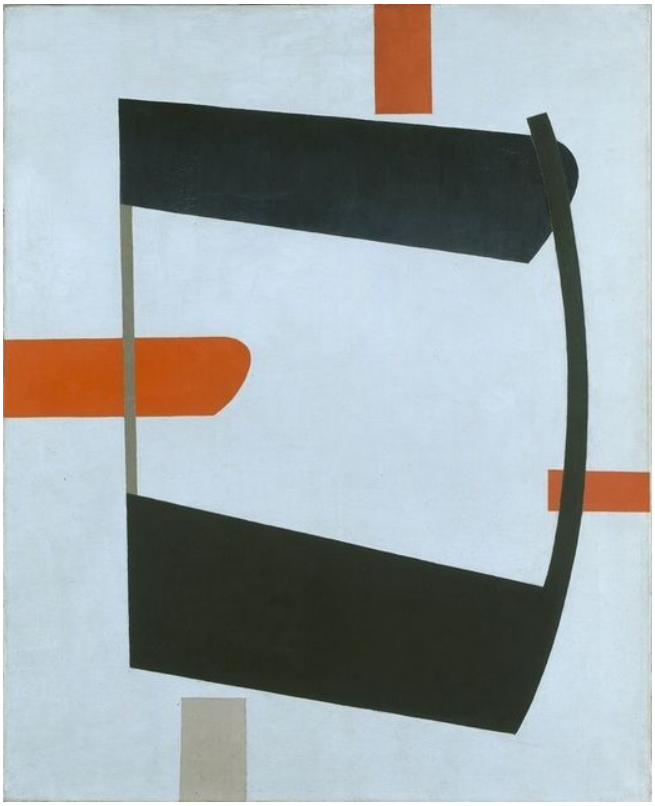


Figure 2.38: Helion, Jean. *Equilibre,* oil on canvas, 1933 (Centro Cultural de Belém, Lisbon). `https://d1ycxz9plii3tb.cloudfront.net/additional_images/4fe21e66226ad30001002ed8/large.jpg`.

- Artist: Jean Hélion
- Completion Date: 1933
- Style: abstract
- Genre: figurative painting
- Technique: oil
- Materials: canvas
- Dimensions: 681x100 cm
- Gallery: CCB

Jean Hélion's work Balance (Equilibre) is a figurative painting, abstract or non-representational. The work has some figures which are geometrically perfect and others which look flawed. Some components of the figure form a cube, in the centre, which interacts with the other figures around it forming a strong support surrounding the cube.

Formal qualities of painting.

The line in the painting is important; you can see the artist was looking to construct some geometrical figures. The brushwork is minimalistic, perfectionist and there is no texture. The colours are cold, even the red. The central figure has a dark pallet, and all the shapes of the constructed cube have different colours: dark brown, dark black and light grey. The figures around this one are in red colour.

The painting does not have a perspective and it has two plans. In the first plan we can see a central shape. In the second we can see two figures, one on the left and one on the right side. We see that part of these figures goes in the back of the central shape, which makes us to think that they are on a second plan. It is unclear whether the other figures, which are on the top and on the bottom, are from first or second plan, as they do not have contact with the central figure.

The composition is central. The feeling of balance is created by the supports around the central figure.

This painting was part of a series called Equilibres. The abstract style was usual for the artist, though he experienced also other styles. It is easy to feel the modern spirit of this artist. The painting was done in 1933, at which time Hélion was a recognizable and leading abstract painter. It had been 15 years since the First World War and again we may guess that people thought that balance had returned to their lives. Cities and countries were recovering, science and industries were growing. This situation might have provoked the young artist to create this modern painting with a modern name.

Jean Hélion could not guess that balance in his life and all world would

not stay for long. In 1940 he joined the army, fighting for France's freedom. He spent two years in prison in Poland, he managed to escape and then he wrote a successful book about his experience.

2.3.3 Other artists

During research we found many artist which had made artworks with the topic of Balance. This was good inspiration and helped us to understand the universe of artworks with this topic. The interpretations of balance are various, but they share a feeling of stability and stillness.

Figure 2.39: Daumier, Honore. *Équilibre Européen,* Lithograph, 1867 (National Gallery of Art, Washington).
`https://artsy.net/artwork/honore-daumier-equilibre-europeen.`

Figure 2.40: Jorn, Asger. *Equilibre Précaire,* Collage and décollage on, 1968 (Galerie Thomas, Munich).
https://artsy.net/artwork/asger-jorn-equilibre-precaire.

Figure 2.41: O'Donnel, Stephen. *L'Équilibre,* Acrylic on panel, 2012.
https://artsy.net/show/
winston-wachter-fine-art-winston-wachter-fine-art-at-palm-springs-fine-art-fair

Figure 2.42: Daumier, Honoré. *Tirez, ça fait équilibre,* Gillotype, 1871 (National Gallery of Art, Washington). `https://artsy.net/artwork/honore-daumier-tirez-ca-fait-equilibre`.

Figure 2.43: Uchiyama, Kim. *Balance,* Watercolor on Arches paper, 2012. `https://artsy.net/artwork/kim-uchiyama-balance`.

Figure 2.44: Nezaket, Ekici. *Balance,* Lambda print, 2012. https://artsy.net/artwork/nezaket-ekici-balance-1.

Figure 2.45: Dulaney, Shawn. *The Balance,* Acrylic on linen over panel, 2012. https://artsy.net/artwork/shawn-dulaney-the-balance.

Figure 2.46: Rachel, Davis. *In the Balance,* Watercolor, 2010. `https://artsy.net/artwork/rachel-davis-in-the-balance.`

Figure 2.47: Cathy, Rose. *Balance,* Hand-formed porcelain and found materials, 2013. `https://artsy.net/artwork/cathy-rose-balance.`

Figure 2.48: Ulrich, Erben. *Balance,* Acrylic and pigment on canvas, 2007. `https://artsy.net/artwork/ulrich-erben-balance.`

Figure 2.49: Mcbride, Rita. *Balance,* Brass, ceramic, bronze, car, 2013. `https://artsy.net/artwork/rita-mcbride-balance`.

Figure 2.50: Fischli/ Weiss. *Equilibres,* bon composite and steel. http://www.matthewmarks.com/new-york/exhibitions/2007-04-27_peter-fischli-david-weiss/.

2.4 Synthesis

The State of Art chapter helped us to find a visual shape for part of the project.

Literature review was divided in two sections: Factors of conception and Factors of design. In Factors of conception we found meaningful information regarding our keywords such as Shadows, Balance, Conflict and Dynamics. It helped us to construct the conception while creating our own interpretation of these concepts. Factor of design helped us to understand the area we are investigating. We found similar projects and we made research on Interactive art and Emotional design. This research helped us to choose tools and ways of communicating with audience and helped us to make installation more appealing and interactive.

Case of study was an important step where we analysed similar projects. These projects were chosen according to strict criteria, which made results of analyses useful and specific.

In conclusion, this chapter was crucial to the start of our Active research. We got the knowledge of the area we are investigating and we know reference projects with similar methods or conception and also the state of the art projects that nowadays point the way forward.

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Active Research

This part of the project consists of a series of successive experiments and presentations. We experiment different materials, light sources, compositions and multimedia. These experiments help us to select combinations of these elements which are then shown in presentations. These presentations are events which help us to collect feedback and understand what changes we

can make. During the presentations we will present a series of experiments with the installation and the ways in which we manipulated dynamics. After each presentation we organized a discussion with the participants where we discuss the installation and possible improvements. This included handing out questionnaires to provide feedback.

3.1 Experiments

In this experimental phase we try to find the most fitful shape, materials and conception for our installation.

During the experiments we therefore had these objectives

- test different multimedia
- test different materials
- test how the shadow works with different conditions of light source
- test legibility of the shadow under diferent conditions

Here we present the experiments which were recorded with camera. Many other, presented in annex Extra, were simply drawn and discussed orally.

3.1.1 Analysis of Experiments

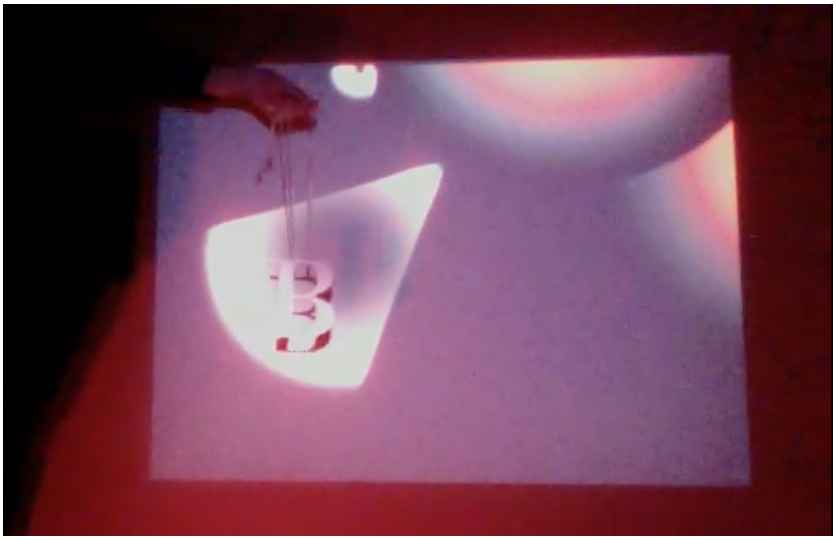


Figure 3.1: Experiment 1

Experiment Nr. 1

- **Materials:** Plexiglas letter B, media, rope, RGB lamp
- **Details:** We used multimedia and one piece of Plexiglas with the shape of letter B. During this experiment we checked the interaction of multimedia and Plexiglas and the effect of the RGB lamp on the installation.
- **Results:** The RGB does not create any significant effect. The Plexiglas becomes a surface for the multimedia.
- **Shadow:** Shadow is legible.
- **Positive outcomes:** We found out the effect of RBG lamp and how Plexiglas reacts to the multimedia.
- **Negative outcomes:** RGB lamp does not have a significant effect.

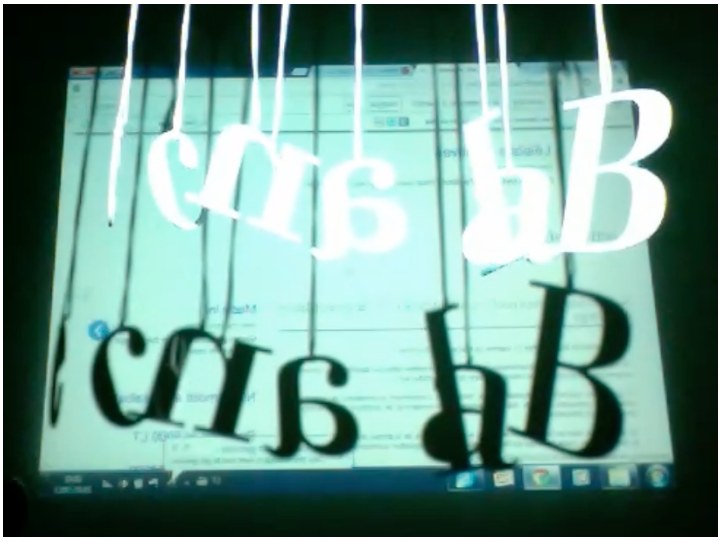


Figure 3.2: Experiment 2

Experiment Nr. 2

- **Materials:** Plexiglas word Balance, word file with written text.
- **Details:** We use the same Plexiglas material but now with the full word Balance. We projected a file with written text. We want to see what effect the word Balance would have with just simply written text, without colours.
- **Results:** Plexiglas becomes surface for the multimedia (text). The letters move around and, from time to time, when the light hits straight the Plexiglas, a reflection is projected with text inside it. This movement is almost impossible to control, creating an interesting experimental unexpectedness.
- **Shadow:** Shadow is legible.
- **Positive outcomes:** We found out an unusual phenomenon with the reflections of the Plexiglas which inspired new ideas for multimedia.
- **Negative outcomes:** It is difficult to control the movement of the letters and their reflections. In order to choose what we wanted to reflect

we needed a lot of planning and experimenting with the paragraphs in the text.

Figure 3.3: Experiment 3

Experiment Nr. 3

- **Materials:** Plexiglas word Balance, light source in front of the installation
- **Details:** We tested how the shadow works without any multimedia or colours. During this experiment we checked the legibility of the shadow for later comparison with experiments where there was media in order to check whether multimedia disturbs the legibility of the installation.
- **Results:** The shadow has a clear shape and is legible.
- **Shadow:** Shadow is legible
- **Positive outcomes:** We clearly see a legible shadow on the wall.
- **Negative outcomes:** Though the word Balance was moving, it missed a stronger feeling of dynamic.

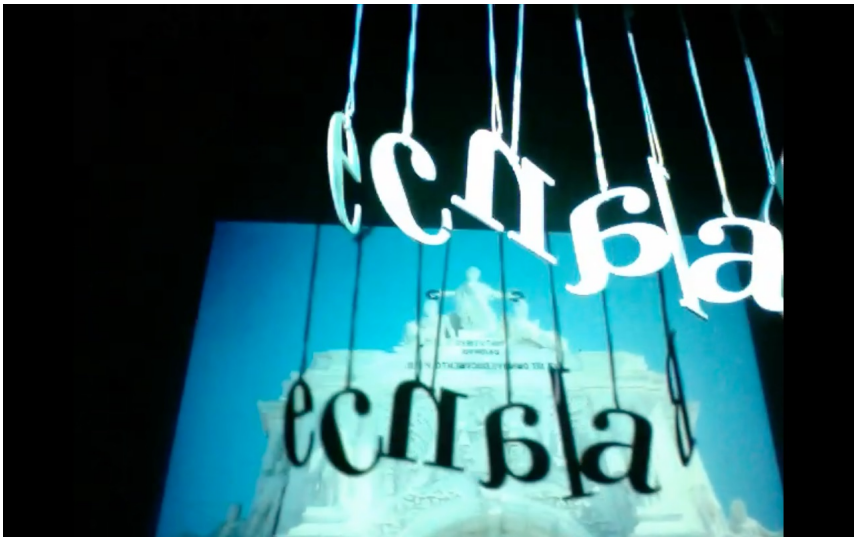


Figure 3.4: Experiment 4

Experiment Nr. 4

- **Materials:** Plexiglas shaped as word BALANCE, multimedia with photos from architecture
- **Details:** As a mean to express the concept of Balance we used a historical classicist building as a background and how balanced and strong they are are while everything around them is changing. We chose Arco da Rua Augusta[1], an arch with a clock in Lisbon. In front of it we have the word Balance made of Plexiglas.
- **Results:** The shadow is bright and the Plexiglas letters become a surface for multimedia and at the same time they reflect the multimedia on other walls. The projected media on other walls included parts of the arch image.
- **Shadow:** Shadow is legible.
- **Positive outcomes:** As experimental fine art it had a pleasant innovative mood.

[1] `http://en.wikipedia.org/wiki/Rua_Augusta_Arch`

- **Negative outcomes:** It was hard to make a strong concept connected with pictures and it did not have enough dynamic.

Figure 3.5: Experiment 5

Experiment Nr. 5

- **Materials:** Plexiglas shaped as word Balance, multimedia
- **Details:** We investigated how multimedia interacts with the Plexiglas shaped as letters and also other shapes.
- **Results:** The multimedia and Plexiglas interact well. Multimedia gives mood and it is projected on the Plexiglas surface, so the white Plexiglas takes the colours of the projection. Installation has movement and dynamics. When we use leftovers of Plexiglas where we previously cut the word Balance from, we see that it reflects media on the other wall, with the shape of the Plexiglas board.

- **Shadow:** Shadow is legible.
- **Positive outcomes:** Plexiglas reacts with the media, creating a shadow and reflecting the light.
- **Negative outcomes:** Multimedia could have a bigger colour pallet so that the reflections of light would be more interesting and more dynamic.

Figure 3.6: Experiment 10

Experiment Nr. 10

- **Materials:** RGB lamp, foil
- **Details:** We tried different materials, working with foil and RGB lamp. We tested what reaction RGB lamp and foil showed.
- **Results:** Foil reacts to the RGB lamp colours but it does not have a significant interaction.
- **Positive outcomes:** The reflection of the RGB lamp has an interesting material texture.

- **Negative outcomes:** It is difficult to reflect a clear shadow with this material.

Figure 3.7: Experiment 11

Experiment Nr. 11

- **Materials:** Plexiglas shaped as word Balance, mirror, and RGB lamp
- **Details:** We used a mirror as the background surface for the installation and an RGB lamp as the light source.
- **Results:** The shadow disappeared and we just played with the space. It gave us some ideas how to use the exhibition space.
- **Positive outcomes:** It created an unreal atmosphere. It was hard to understand when we were seeing the real letters and when we were seeing a reflection in the mirror. The colours of the RGB lamp also created a nice atmosphere.
- **Negative outcomes:** It was not possible to make a shadow when using a mirror as the background surface.

3.1.2 Legibility comparison

To understand if the legibility is not disturbed by multimedia, we chose to compare experiments nr. 3 and nr. 5. Experiment nr.3 has no multimedia and Experiment nr. 5 has. Both of the experiments have Plexiglas shaped as the word Balance.

Figure 3.8: Experiment 5

Figure 3.9: Experiment 3

Conclusions

From the results obtained during experiment nr. 5 we clearly see that legibility is good: all the letters are easily understandable. We found out that colourful multimedia creates contrast with the shadow and the letters become more visible and legible. Our multimedia does not have a negative influence for legibility of shadow.

Figure 3.10: Installation

3.2 Installation

3.2.1 Conception

The topic for this installation is Conflict. Nowadays people live their lives constantly facing conflict situations. These situations are hard to control and hard to solve. They are often provoked by little or even insignificant impulses and frequently are blown out of proportion, with stress and preoccupations making everything worse. We felt the need to address this topic and to depict it as the complex interaction it is.

The evolution of the conflict is depicted on the projected multimedia. The conflict impulses are represented by figures. We used little circles for the initial impulses, often insignificant, and sharp triangles for the bigger, more active impulses. The speed of the figures also represents how aggressive they

are. When figures clash, they create more impulses and increase the intensity of the conflict. The colours of the multimedia represent the intensity of the conflict and also of each of the parts. We state that conflict generates more conflict and it could be like this forever. In order to stop the conflict, the opponents should keep the balance and not to attack each other.

So Balance, in our case, is the solution to the conflict. In conflict, balance might be confused with passivity but its strength is greater than that of the conflict. The problem is whether the opponent will be using it too.

The typeface chosen for the Plexiglas letters had to represent the concept of the work so we chose a font related to balance. We chose Bodoni, a serif font with a great history, classicist, romantic and calm, which is perfect to represent the concept of Balance.

The installation has the Plexiglas letters placed in front of the multimedia, projecting their shadow on the multimedia. The projected shadow, spelling the world Balance, represents how in a conflict situation the concept of balance is forgotten and left in the shadow, the background. The projection that can be seen on the Plexiglas letters themselves shows how the concept of Balance is actually derived from the concept of Conflict. Balance is a solution that rarely is remembered.

3.2.2 Multimedia of project

Multimedia was done using AfterEffects program. The drawings were made using Illustrator program.

Multimedia has a length of around 3 minutes and will be played in loop. For us it is very important the first impression the person gets when entering the exhibition space that is why every part of the multimedia is dynamic and entertaining. We expect the game of light and shadow to keep the attention of the viewer so that even if he would enter the exhibition space after the start of the multimedia, he would stay longer to see the entire multimedia.

3.2.2.1 Figures composition in Multimedia

The composition of the media is horizontal: the figures move mostly from the left to the right side and vice-versa. As the conflict grows, so does the tension in conflict. The media follows these changes and so the path of the figures becomes less straight, more complex.

Figure 3.11: Movement of figures 1

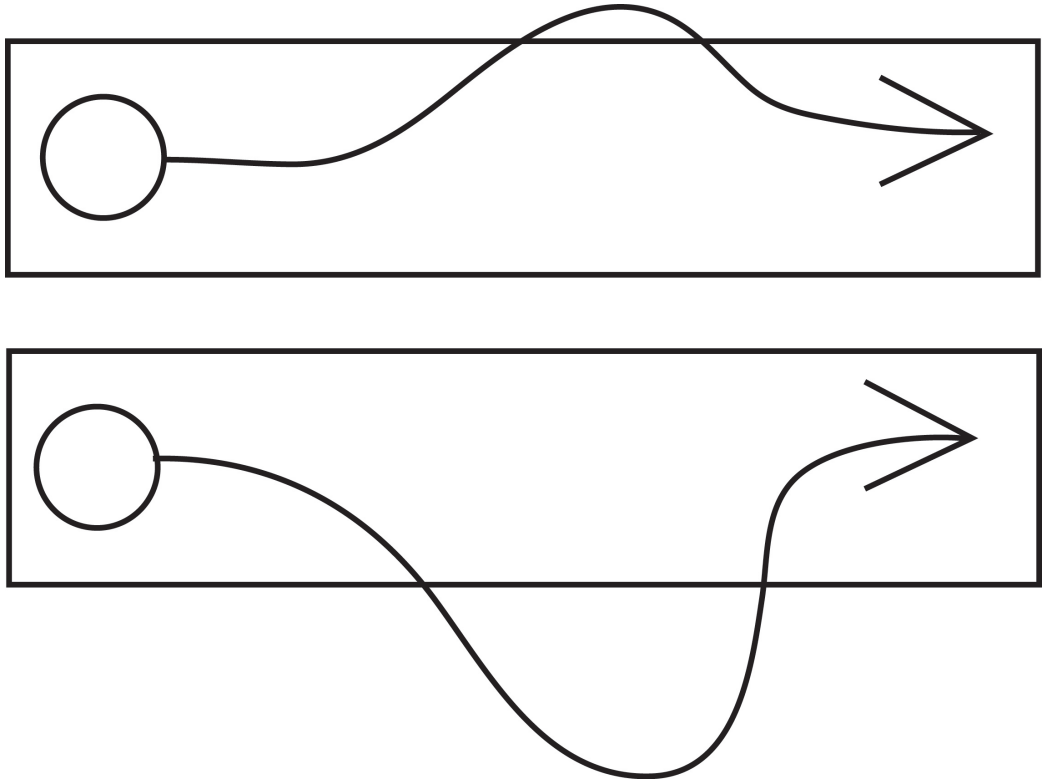


Figure 3.12: Movement of figures 2

The figures eventually go out from the frame, representing emotions which get out of control. We used this effect to create more tension and cause unexpected feelings.

3.2.2.2 Figures shape in Multimedia

Shapes in our life have an influence similar to that of colours. There are friendly colours and friendly shapes, dangerous colours and dangerous shapes. Rounded shapes tend to be considered friendlier as they attract less our attention so our brain does not associate them with danger. This is the reason why traffic signs warning about danger are not rounded but sharp, usually triangles.

The circles at the beginning of the media mean a comment from one of the sides. As in road signs, it is a slightly unpleasant way of giving

information. The other side answers with a similar but larger circle, more intense to represent the growing tension. Then the circles become triangles and the triangles change colours as tension grows. Triangles already mean a sign of danger. It is not a friendly comment or critique but a real impulse of anger. Triangles are pointed to each other to increase the feeling of tension.

3.2.2.3 Figures orientation in Multimedia

The first studies about the emotions and dynamics of single shapes were made by Irena Pavlova, Arseny Sokolov and Alexander Sokolov [Pavlova M, 2005]. Their experiments consisted of showing participants triangles, ovals and lines in several different orientations and to record their emotions. The triangle balance on its point or lying on the side was considered the most stable followed closely by the oval in the same position. The instability of the figures was correlated with a feeling of suffering and fear. They also found evidences of a correlation between how vertical the figure was and a feeling of joy: the more vertical, the more joyous it seemed.

Pavlova and her colleagues argue that the imbalance in the pictures is what leads individuals to attribute specific emotions to them and there is a direct link between perception of the physical orientation of an object and perception of emotional states. One consequence of this study regards abstract art. It might be that our perception of this art is influenced by our feelings towards specific shapes and their orientation more than we notice at first sight.

With this in mind, we frequently changed the orientation of the figures in order to express variations of mood.

3.2.2.4 Figures colours in Multimedia

Colour is often considered one of the best ways to transmit messages and express mood. It is commonly accepted that specific colours can provoke specific feelings on the receiver. One good example is white roses, usually associated with pure love and formal ceremonies and frequently used in such

ceremonies. Another good example is dressing in black to show we are in a mourning period, a tradition dating back to the Roman Empire.

The examples given above relate to colour symbolism which, even if we are not totally aware of it, we do have a lot. An association in London called Colour Affect investigates these associations we make with each colour. These are conscious associations we are conditioned to make.

A good example of how these associations are still being explored is the British artist Neil Harbisson[2], an experimental contemporary artist who researches how people understand colours. Harbisson, who was born with Achromatopsia, got an implant for an antenna with a built-in camera. This antenna provokes different stimulus to his brain depending on the colour that the camera films and so allows him to recognize what colours he is looking at. Based on this stimulus, Harbisson creates artworks that interpret sound as colour and vice-versa.

In our multimedia we also have a symbolism for colours. All multimedia starts with light pastel colours which look somehow naive and then transform to darker, deeper colours which look more aggressive, suggesting that this conflict will not finish so easily.

3.2.2.5 Figures speed in Multimedia

At the beginning of the media, when the conflict starts, figures move slowly until they touch the opponent's side. The moment this happens is crucial as it marks the beginning of the conflict and from here the speed of the figures starts increasing and the movement becomes more intense. The same happens with the reactions of the opponent. This will keep happening with every interaction.

The speed in media is a very important tool to create mood and to present growing tension. When humans get angry their reactions to impulses and provocations also become faster. When a human is nervous he thinks less so he provides the feedback more quickly. So a higher speed shows an angrier

[2] `http://www.ted.com/talks/neil_harbisson_i_listen_to_color`

and more nervous situation, when people lose their head and they put out everything that is kept inside.

3.2.2.6 Storyboard

We made two multimedia projects to present the topic of conflict. Multimedia I was the main one and it was presented in all presentations. Multimedia II was a more experimental alternative and was presented only in presentation II. The storyboard below is a collection of frames from the multimedia projects, presenting the evolution of story.

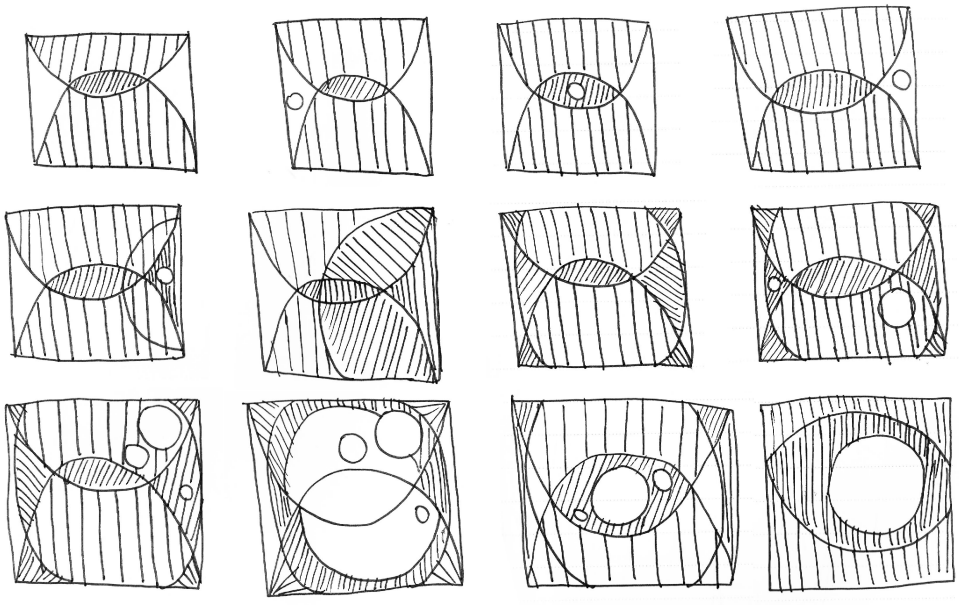


Figure 3.13: Storyboard sketch for multimedia I

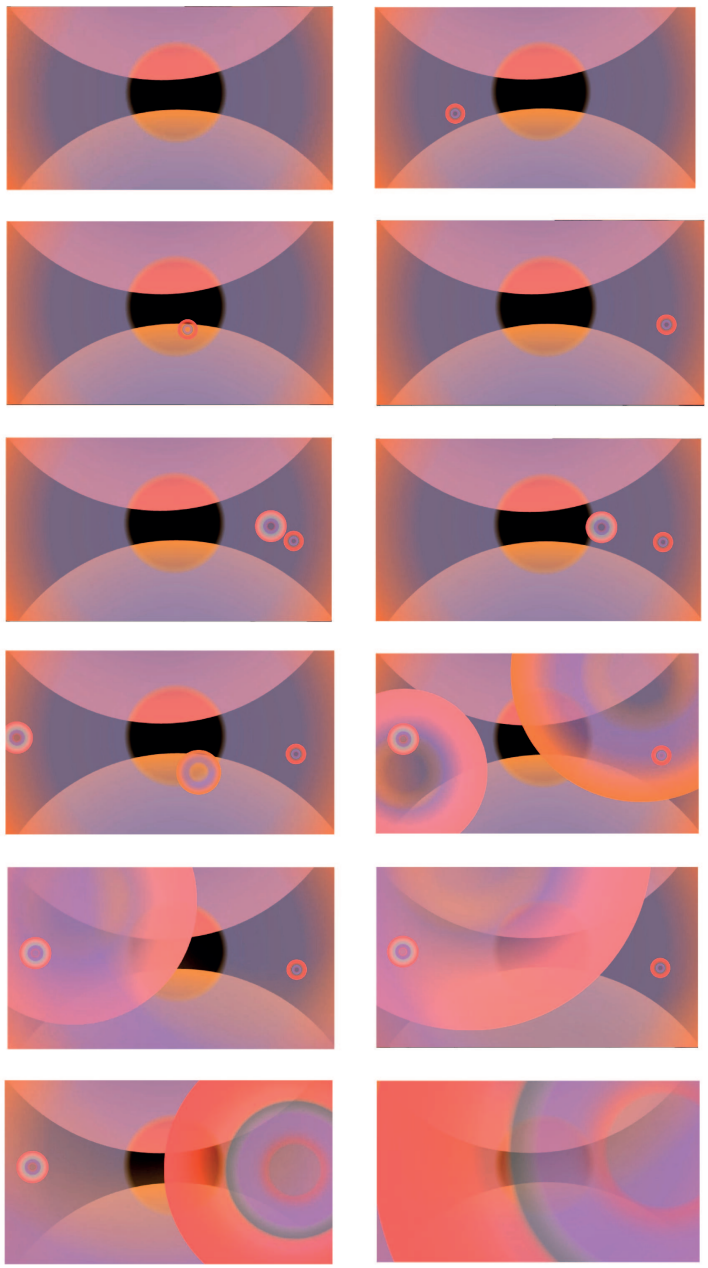


Figure 3.14: Multimedia I, part 1

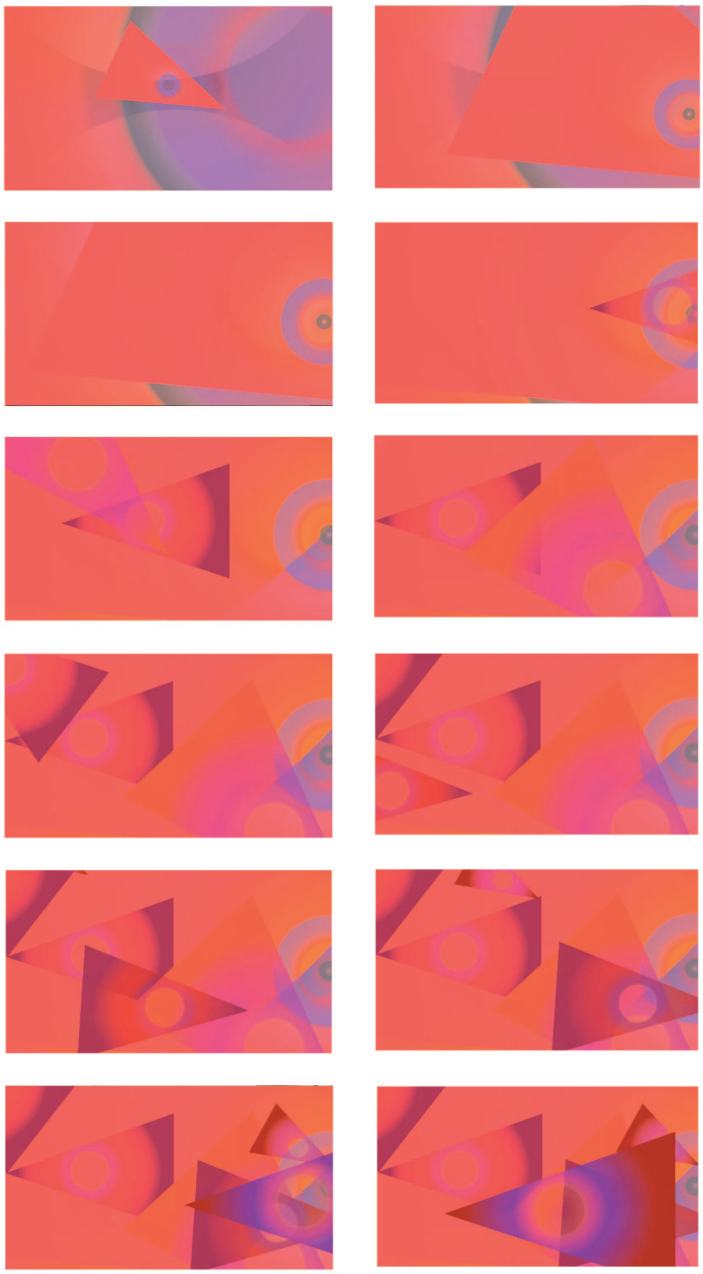


Figure 3.15: Multimedia I, part 2

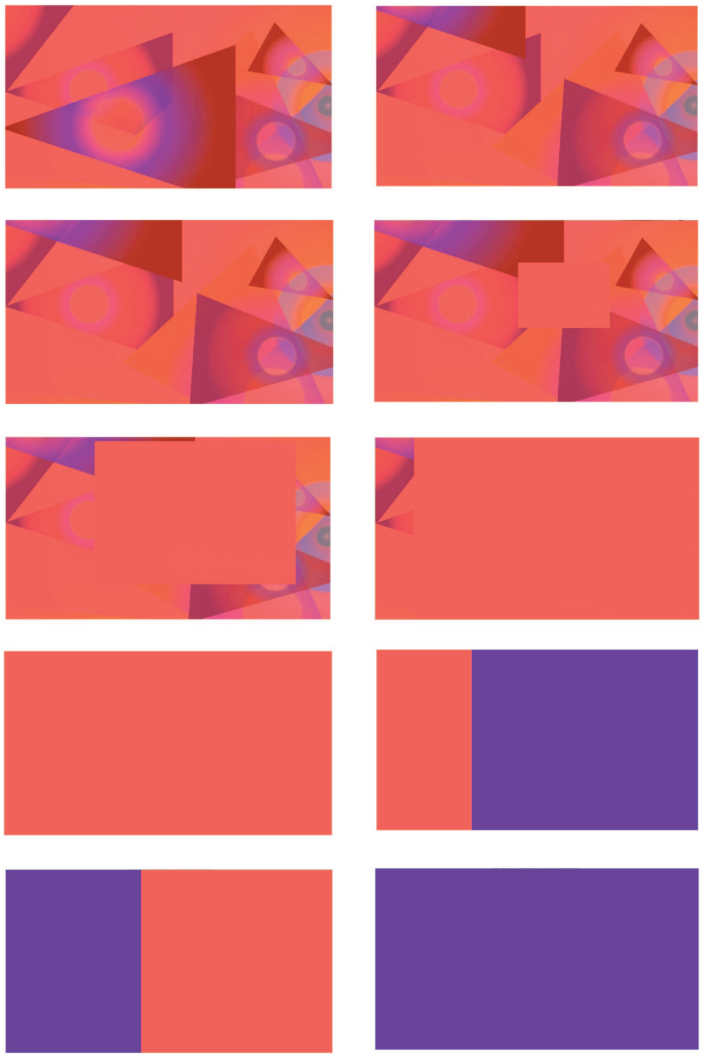


Figure 3.16: Multimedia I, part 3

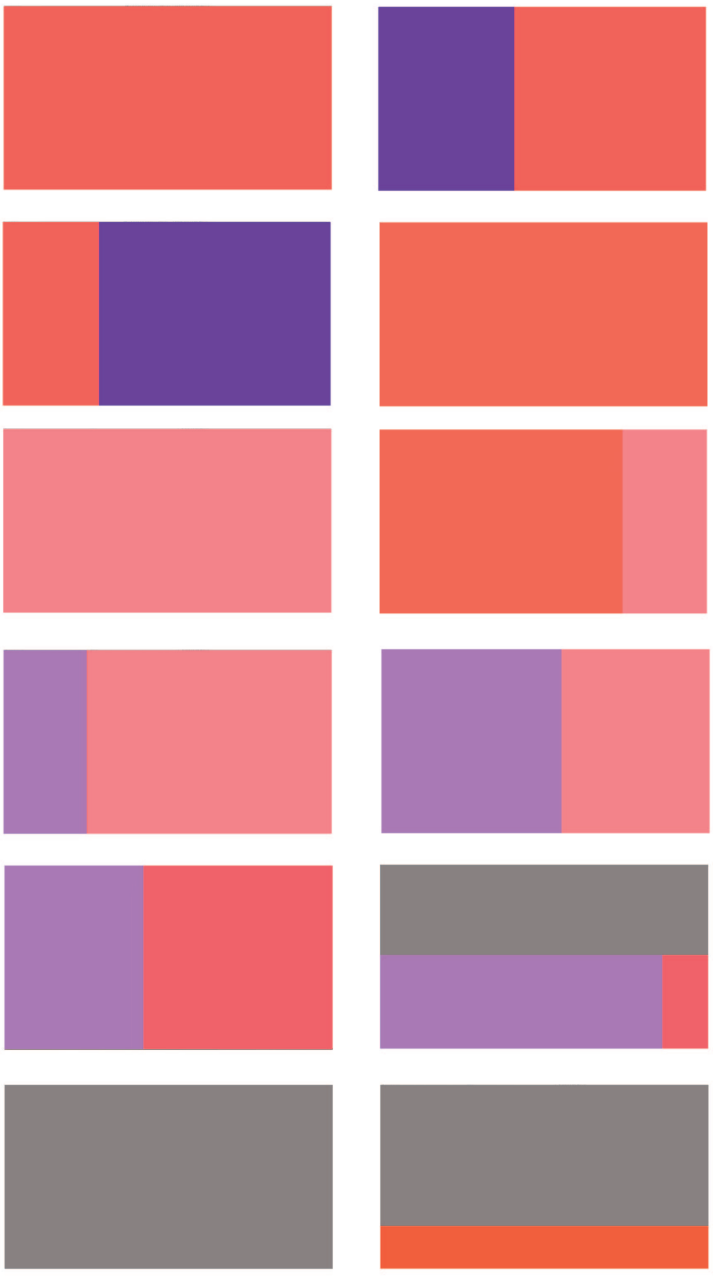


Figure 3.17: Multimedia II, part 1

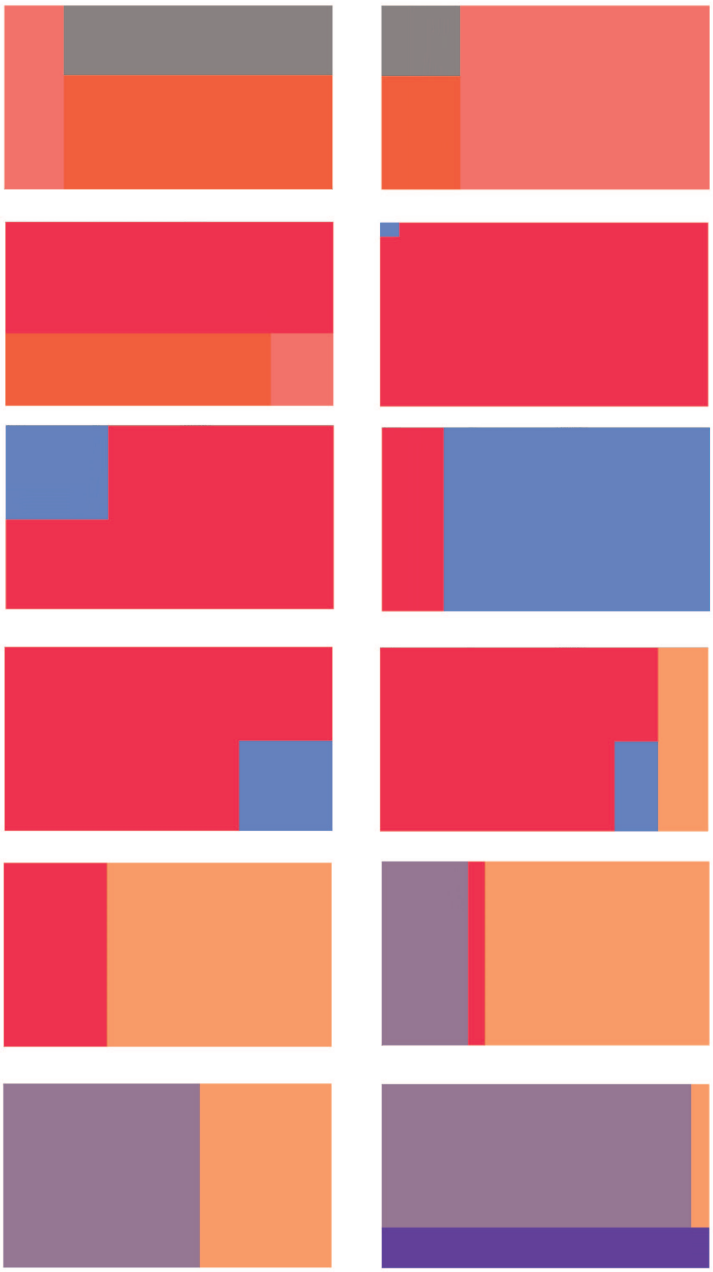


Figure 3.18: Multimedia II, part 2

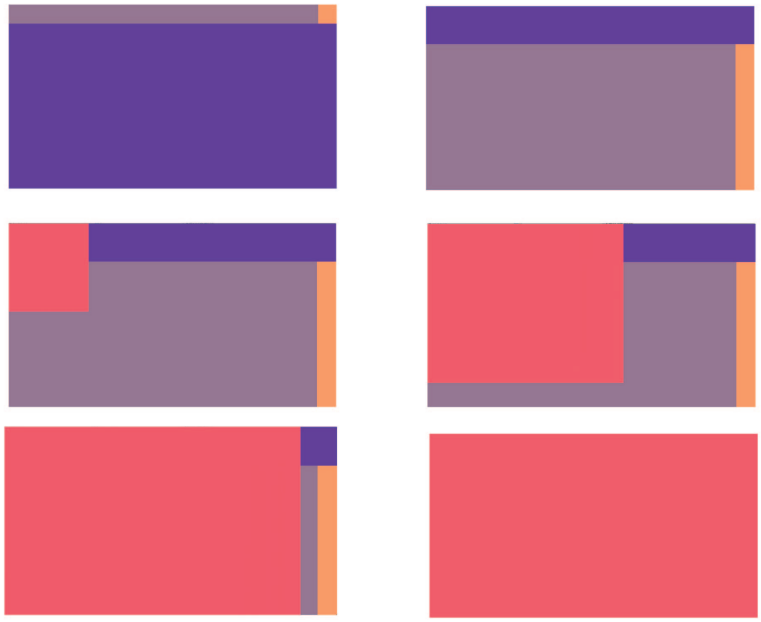


Figure 3.19: Multimedia II, part 3

3.2.2.7 Audio

Audio effects in multimedia help to better express feeling and to create a stronger interaction with the audience. Choosing the right audio for multimedia is a great way to create a stronger impact and the same is true for timing; the audio should fit the multimedia for each of its moments.

In our project we experimented several audio tracks created by us. The program we used to do it, called Cubase, is popular in nowadays musical industry.

While we were experimenting with the sound we realized that audio effects do make installation more appealing but take attention away from the shadow graphic. We concluded that for the presentations and for the whole project we would not add sound effect in order to keep participants focused on shadow graphics. However, we kept the idea for future use, when the project would be presented not as a research, but as a piece of art.

3.2.3 Letters

In our project we have three different types of letters

- Plexiglas letters, which are three dimensional objects made of Plexiglas
- Shadow Letters, the shadow created on the wall by the Plexiglas letters
- Reflected letters, the light reflections of the Plexiglas letters

3.2.3.1 Typeface

When considering what typeface to use to express our conception of Conflict, we thought of two possible criteria:

1. the typeface should be historically associated balanced
2. the typeface should be physically balanced (proportional)

As Conflict is a stylization of the human being and history, we decided to chose the typeface according to criteria 1, as this also evaluates the font's history and connection with Humans. Bodoni fits this criteria and suits our conception both visually and expressively.

3.2.3.2 Materials of letters

After trying out several materials we decided to use Plexiglas for the letters of the installation. The main reasons for this was that Plexiglas acts as a surface for multimedia without distorting it and it reflects the light from the projector, creating reflected letters.

The effect obtained with the reflected letters made our project more complex and more unpredictable, leading to many interesting discussions and suggestions during the presentations.

3.2.3.3 Laser cutting process

The laser cutting process is a technology used to cut materials with high precision, first developed in 1965 by the Western Electric Engineering Research Center. Though it was originally made to cut metal, in 1970 it was already used to cut other materials. Nowadays this is a common technology, available in small businesses and schools.

This process is especially useful for graphic designers as it allows us to easily and quickly cut letters or logos. It works very well with Plexiglas, using a carbon dioxide laser.

To start the process we need to create a file with the shape that will be cut. For this we can use any program that allows you to export it in AutoCAD Drawing format. The size of the outline should be 1pt and the distance between different objects should be at least 1mm. For best results we should use Plexiglas not thicker than 5mm with 3mm being the recommendation. The laser machine cuts the Plexiglas by moving the laser around it. This create a light that is dangerous for human eye so we should only check at the beginning if it is going good and then to check the results at the end.

In our case the machine has a size limit of 800x450mm for the Plexiglas so we had to cut one piece which size was 800x450 and an extra piece which was 200x200 mm and had the letter E in it.

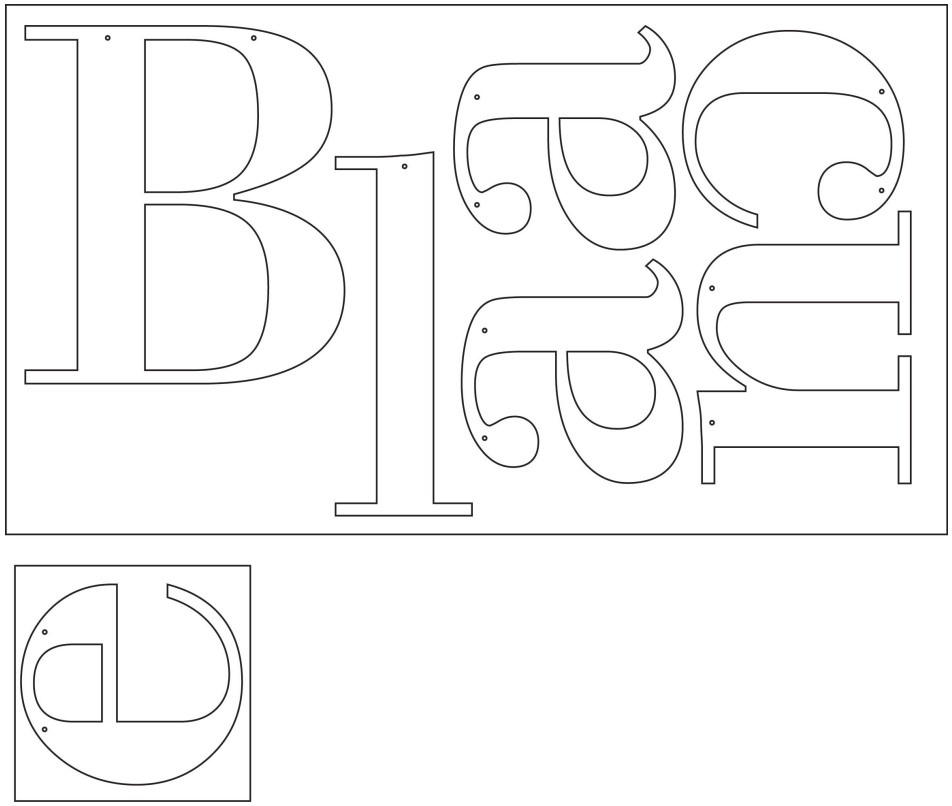


Figure 3.20: The drawing of letters for laser cutting process

3.2.3.4 Size of letters

The capital letter B has a height of 30 cm and all others non capital letters have an height of around 19 cm. The set of letters creates the word "Balance"with the dimensions 30x180 cm.

3.2.3.5 Colour of letters

During the experiments it was clear that white materials react intensely with the multimedia, displaying and also reflecting the light. This adds complexity to the installation. The mood that white colour brings and its association with the concept of Balance made it an obvious choice.

Figure 3.21: Colour of letters

3.2.3.6 Size of shadow letters

The size of shadow letters depends on the distance between wall and projector. The minimum recommended distance between surface and projector is 200 cm. This distance makes shadow letters have twice the size of the original Plexiglas letters.

3.2.4 Elements of Dynamics

One of the objectives of this project is to create dynamics within the installation. In order to do this we used two different methods. One of them, a multimedia projection, is more psychological while the other, the movement of the Plexiglas letters, is an actual physical movement.

We chose the multimedia projection as an element because it creates a feeling of dynamics which is generally accepted as so. In the multimedia projection there are changes of colours, movement, speed and other factors which we believe create a feeling of dynamic. The multimedia is projected onto the Plexiglas letters and so is seen both on the background and on the Plexiglas letters. We made experiments with several different media representing different visual interpretations of the chosen conception.

In a more standard manner, we introduced a physical movement in the installation which would be easily recognized by everyone. In order to create this movement, we hung the Plexiglas letters on a wooden pole using ropes. The letters were then freely moving as long as there was some air movement or movement of the pole. This method proved to be quite suggestive as people kept coming up with new ideas of improving it.

In the end we decided to use both methods simultaneously as this makes it more likely that people get the feeling of dynamic. The methods are complimentary and they have a synergy that generates stronger results.

3.2.5 Transportation and exhibition space

As this installation is made to be exhibited, where and how we can do it is one of the most important aspects of this work. When we think about spaces we should think about the adaptation to the space. This installation will be presented in three different spaces. All of these spaces must satisfy some requirements and the installation should adapt as much as possible to them.

3.2.5.1 Requirements for exhibition space

The exhibition space should have no natural light so that the projected media may be easily visible. It should also have a white wall or special white screen where to project the media. It is also important that there is enough distance between the projector and the wall (minimum 200 cm). Though it is not mandatory, it is good to have a high ceiling and a lot of space around the installation. This helps to create a more active atmosphere. It should be a public place so people can visit and interact with the installation.

3.2.5.2 Transportation, adaptation of Installation

The installation is composed of these components

- Multimedia
- Plexiglas letters
- Pole and ropes

The multimedia is saved in USB. Each Plexiglas letters has a height of 30cm and it is fixed to the rope, so it takes little space. The total weight of the installation is around 2 kg.

3.3 Promoting the project

3.3.1 Name

For the name of our project we decided to keep the same as the dissertation title. This avoids creating confusion and makes it is easier to find references to the project and dissertation.

As a tagline, the way of explaining the product or project to audience in a short way, we will use the phrase *Shadow and experiments on them.*

3.3.2 Logo

We decided to keep the logo simple and minimalistic, with non serif letters. As dynamic is an integral part of the project, we included dynamic in the

logo by playing with the position of letters. The logo is composed by the letters S, H and G. “S H” are the initials from the word Shadow and letter G is an initial of the word Graphic. The letter H is slightly rotated to the right side, creating not just a dynamic but also playful and elegant feeling. Even thought the logo has initials in it we expect people not to literally read it.

Figure 3.22: Shadow Graphic logo

3.3.3 Posters

3.3.3.1 Promoting Presentation I

The first experiment occurred at a time when the graphic elements were still unclear and more abstract.

In the poster we see one of our main graphic elements – the circle. It is a central composition in order to make the poster look more balanced, clear and minimalistic. The colours, chosen to match the media, are more pastel in order to look experimental, strange and modern. The title is written in Helvetica. This font was chosen as its non serif character makes it easy to understand and to apply to different contexts. The date and time of the presentation are on the right top corner in order to maintain balance, not disturbing the central circle.

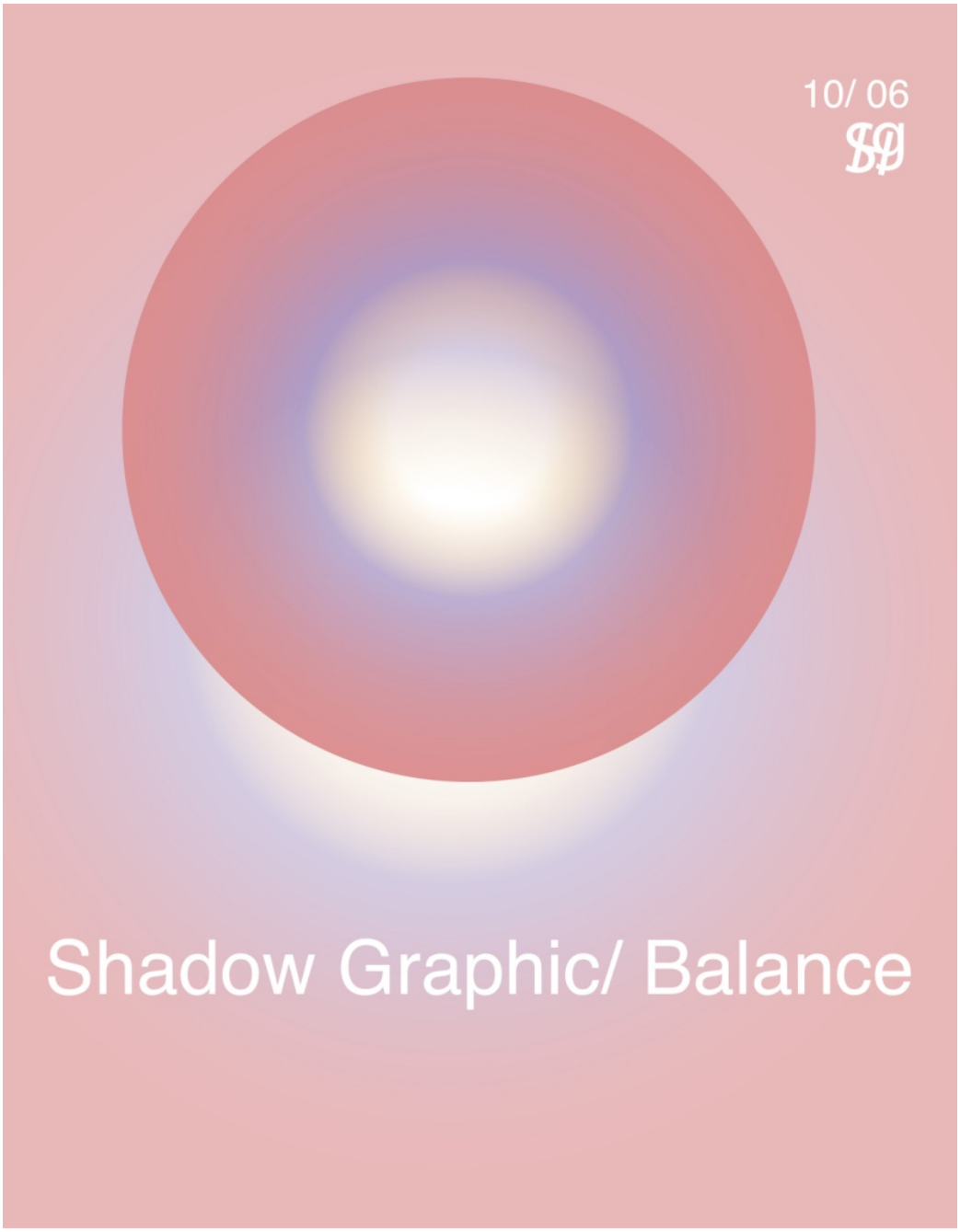


Figure 3.23: Poster for Presentation I

3.3.3.2 Promoting Presentation II

The second presentation was done one month after the first one. During this month we researched a lot of art works with similar conceptions. After analyzing these art works we decided to create a new poster. The new work is inspired by Francis Picabia's work Balance, namely the graphic elements shown behind the main circle. They are figurative abstract elements which aim to keep the circle in balance. The elements are unclear shapes so that it makes the viewer think what is creating the balance in the graphic. The colours were chosen again to be similar to those of the multimedia, keeping the consistency in all the works. There is no information about the presentation because this graphic was used not as a poster but attached to invitations and on websites.

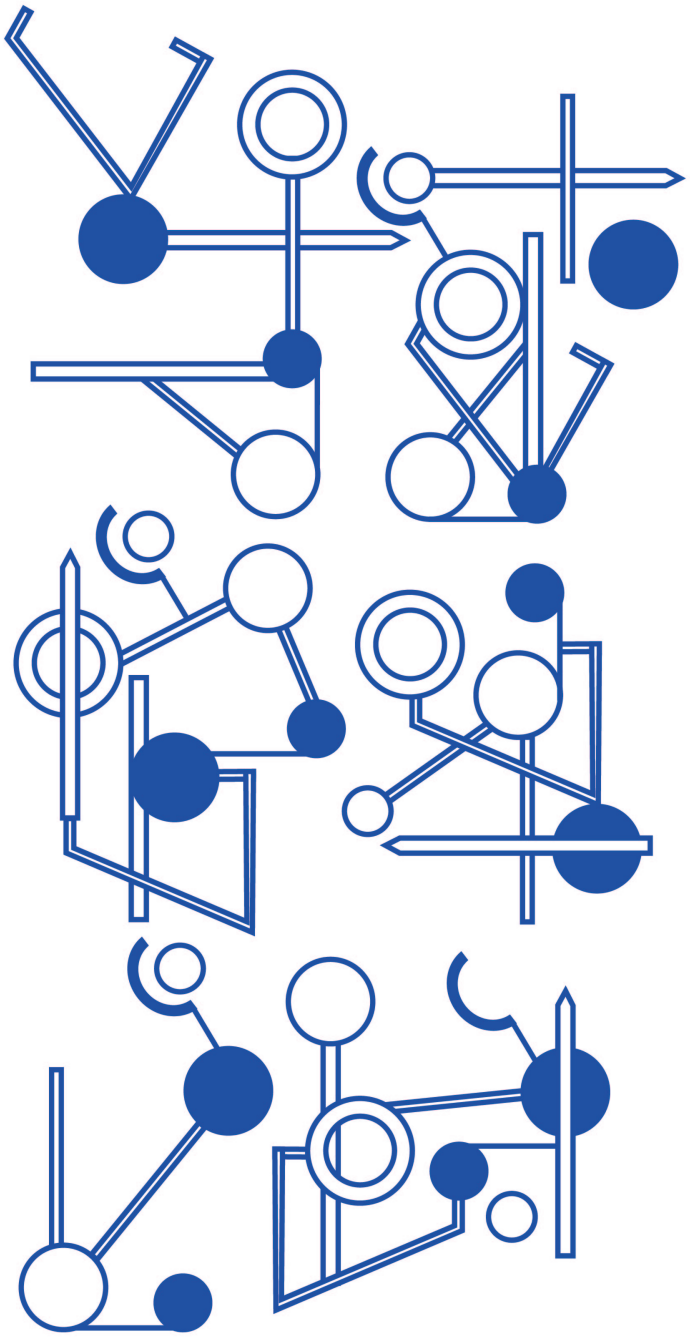


Figure 3.24: Redrawing of Francis Picabia's Balance

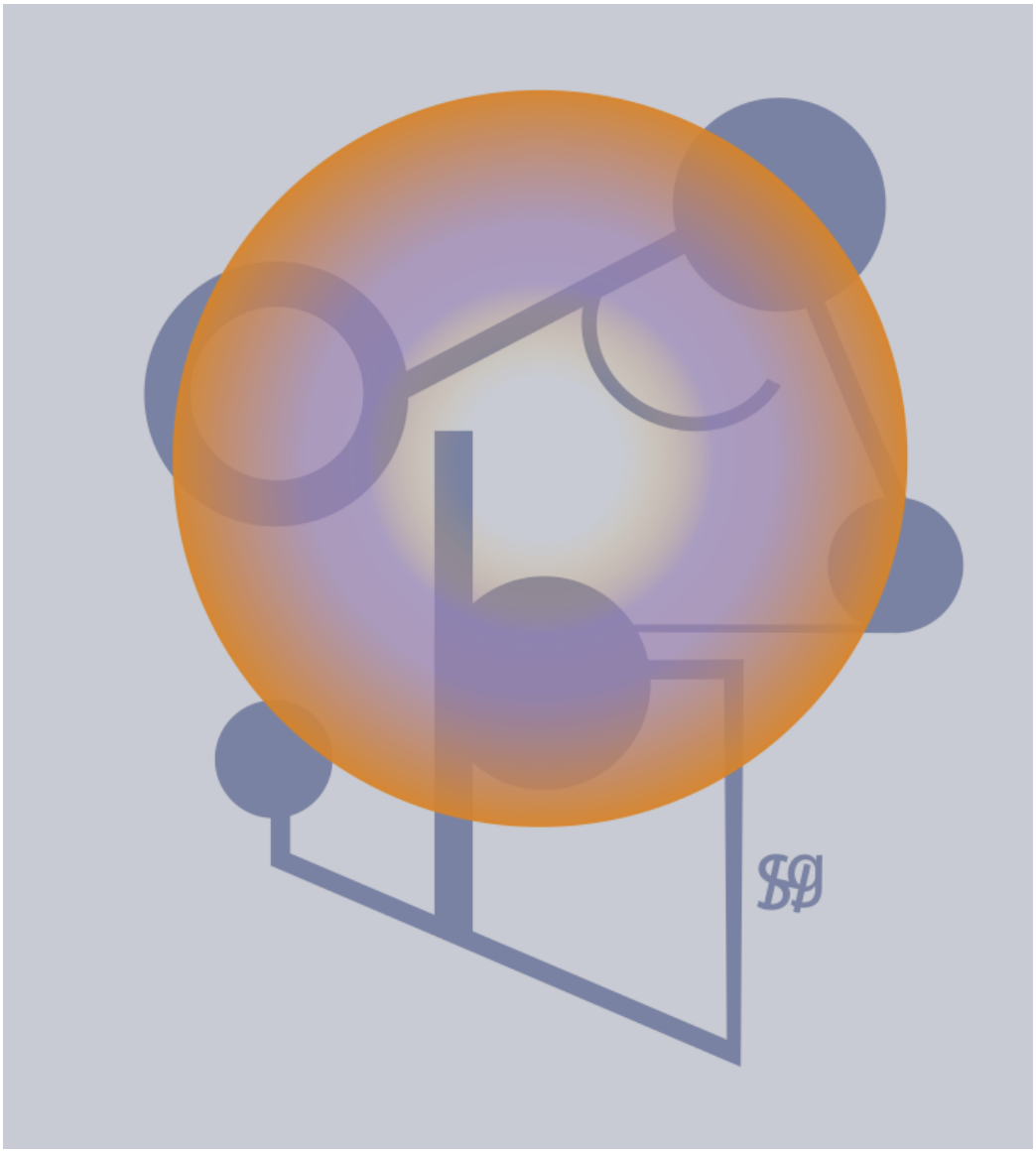


Figure 3.25: Poster for Presentation II

3.3.3.3 Promoting Presentation III

For the two first presentations we had printed posters. For the presentation in Fabrica we wanted to try a different way of presenting the project.

We used same technique as we used to make Plexiglas letters. We cut with laser the name of the exhibition and the logo which were later sticked to the wall. As the presentation had a more free style we decide to make a print with the conception of the project. The print included some graphics from previous experiments.

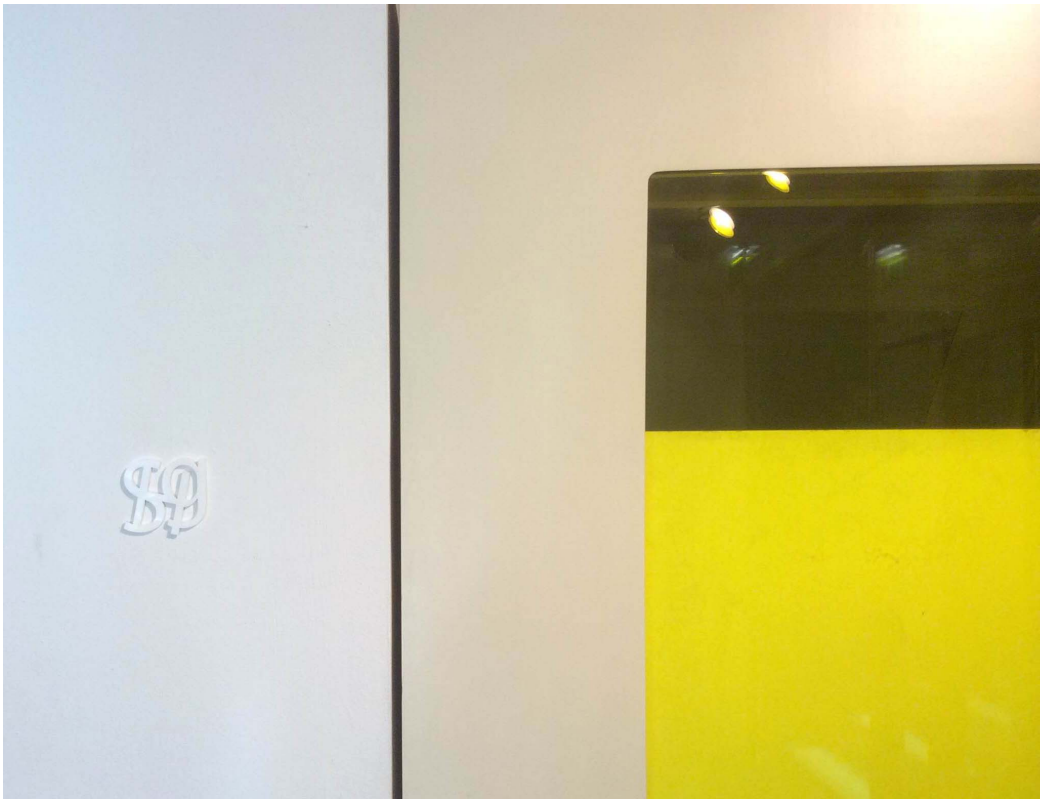


Figure 3.26: Plexiglas letters used in Presentation III

3.3.4 Social Media

While making this project we thought not only on exhibiting it to the public around us but also virtually. Presenting projects in a virtual space is a comfortable way of reaching people all over the world and allows us to receive even more feedback. We decided to create two profiles to present our project, on these social networks

1. Facebook

2. Tumblr

The Facebook page was chosen as a good virtual space to reach people. Many people use it daily and it is easy to advertise the page on Facebook. There is also the option of creating and advertising events.

Tumblr was chosen so that we had a more specific space where to write down annotations about the project. People who use Tumblr are bloggers who pay attention to written text and image.

For this virtual profile is also very important the name and the image. We decided to keep the name simple and connected the dissertation. The name Shadow Graphic looked appealing and fitful.

However, virtual space does have disadvantages. One of the most negative factor is that in virtual space participants and followers cannot see project under good conditions; even filmed material cannot present the project as it actually is.

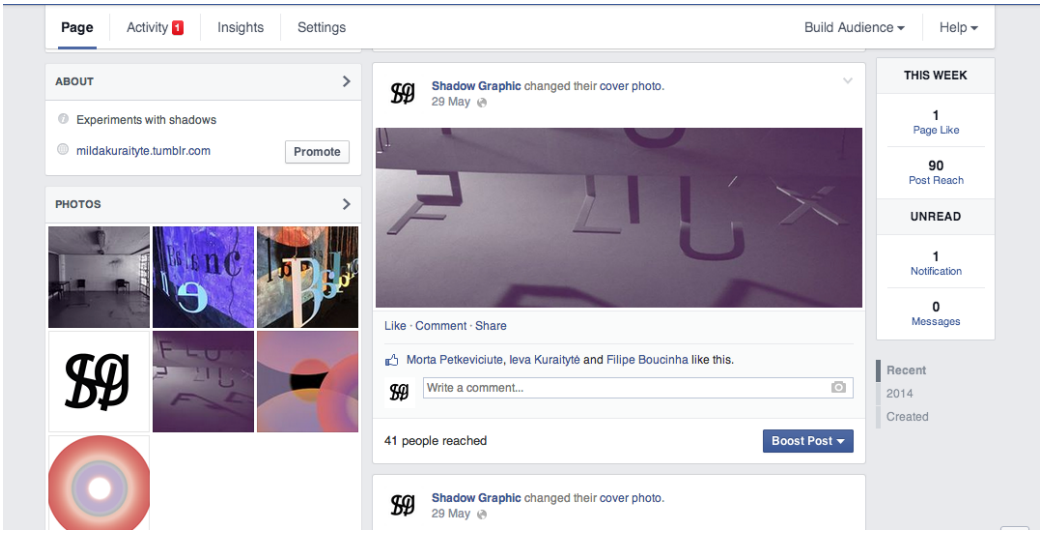
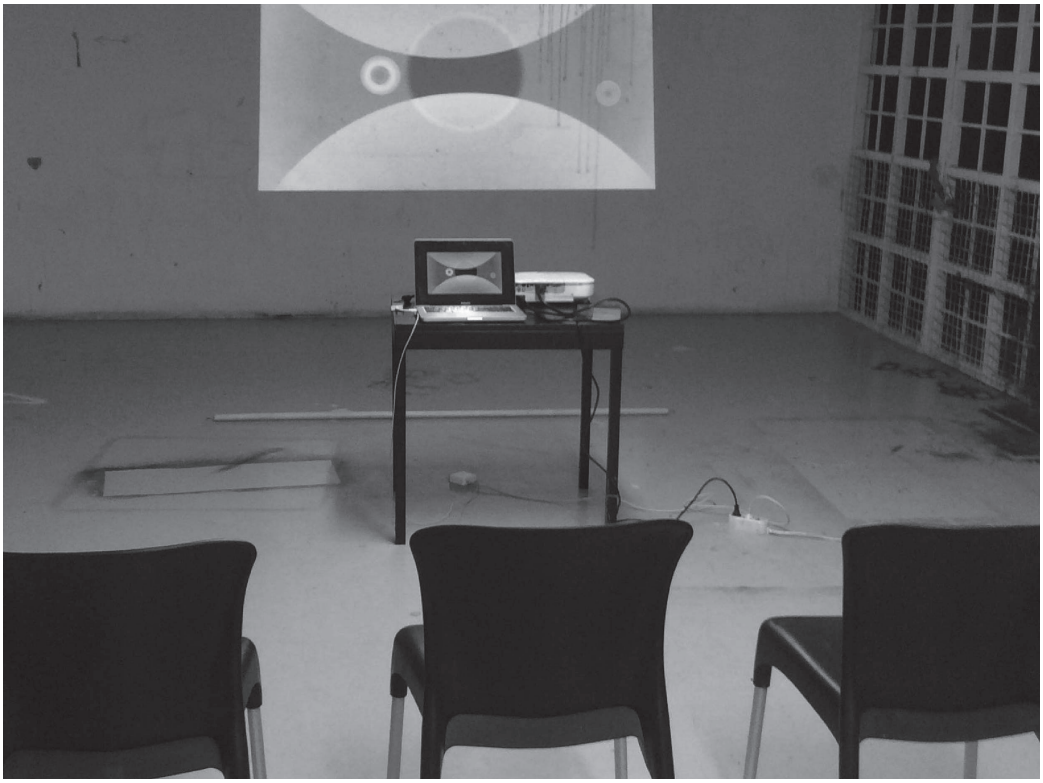


Figure 3.27:
https://www.facebook.com/pages/Shadow-Graphic/713253818741449

Figure 3.28: http://mildakuraityte.tumblr.com/

3.4 Presentations



In order to understand what improvements we can have on the installation, we did three presentations to different sample groups before presenting it to our focus group. In each presentation we handed out surveys and collected the feedback which we present in the following sections. This enabled us to make some changes in order to improve the installation.

3.4.1 Presentation I

The first presentation was made in SM art residency. This place was chosen according to the following criteria

- should be a public space
- should have people knowing about arts (experts)
- should have a lot of space
- should be an innovating and alternative place

Place This residency has a lot of people from different countries that come to create, present, exhibit and discuss their works. In SM there are also artists who live permanently and organize everything in the residency.

Space of exhibition The residency is composed by two buildings, each with three floors. Though there is a lot of space, we needed to choose a space where we could fit the installation and have the people standing or sitting far from the installation.

We chose a big space in the top floor, under the roof. It had an area of 4x12m, enough for our needs. One of the problems of the room was that it had a curved oblique ceiling. Another problem was that the walls were not plain white: the ceiling was dark brown and the wall was old and with a strong texture.

Time The presentation was done on 12th of June, starting at 19h and finishing, after the discussions, around 22h.

Details of the presentation

- **Multimedia:** The multimedia was projected on an old wall with a lot of texture, creating a natural effect on the multimedia. It changed its colours and this gave it a special character: the multimedia was not so

bright and at the same time the shapes in the multimedia were not so clear and not so visible.

- **Movement of letters:** The top floor has one single window which was close during the presentation not to let sunlight inside. For this reason there was almost no air movement which was very important to create the movement of letters. Letters were almost not moving.

- **Reflection of letters:** As the letters were not moving enough there was not much reflection of letters. As the room was in the top floor and not straight the letters were in strange locations of the space so they were not visible at all times for all the participants.

- **Space:** Though there was a lot of space, the fact that the room was in the top floor created some complications. The background for the reflection of the letters was not appropriate and this made us to think a lot about where to exhibit the installation.

Questionnaire for participants The questionnaire for presentation I, presented on Annex A was made of seven questions, which help to understand the opinion of the participants.

The first and the second question are for creating a profile for the chosen sample group. Knowing what age group they belong to might show their interests and experience. Occupation shows the skills and working area of the participants.

With question three to five we are asking how participants understood the entire project.

The sixth question evaluates how some specific parts of installation are dynamic.

The seventh question is for recommendations. In this part we are asking for participants to recommend and to suggest possible better solutions for the project.

1. **Age** - The average age of participants is 30 years old.
   Conclusions: We can guess they are mostly working and having experience.

2. **Occupation** - 60% of participants work with art. From these 60%, one third are graphic designers and another third are photographers.
   Conclusions: Most of participants are experts in some area of art, mostly photography and graphic design. We expect more technical feedback from designers and more artistic and conceptual from photographers.

3. **Are projected letters legible?** - 80% of participants said that letters are legible.
   Conclusions: Letters of composition were clearly legible.

4. **Is conception easily understandable?** - 80% of participants said that the conception was easily understandable. From these 80%, 38% said it was clear only after explaining the conception.
   Conclusions: Conception was easily understood by participants, but it needs more explanation or a better presentation.

5. **Do you think multimedia makes installation more dynamic?** - 100% of participants said that multimedia makes installation more dynamic.
   Conclusions: The multimedia helps to create an effect of dynamic.

6. **Which factors in installation make the strongest impression of dynamic?** -

   - multimedia - average evaluation 3,5
   - movement of letters - average evaluation 3
   - reflection of letters - average evaluation 3,6
   - other - 40% of participants filled this option with an average evaluation of 2,5

Conclusions: The strongest impact participants felt was that of the reflection of letters, though all the factors have very similar ranking. The weakest factor was the movement of letters.

7. **Recommendations** - 90% of participants gave suggestions on how to improve installation
   Conclusions: Mostly, participants recommended adding sound effects, having more multimedia projections, using simpler graphics and creating more interaction between the installation and the viewer.

Presentation I conclusions: Projecting the multimedia on an old and textured wall created a very interesting and positive effect. There was not enough movement and reflection of the letters which was caused by the chosen space. The letters were legible despite the background texture. The conception was easily understandable after some basic explanations. The multimedia created the desired effect of dynamic and the reflected letters were considered one of the best ways to create dynamic.

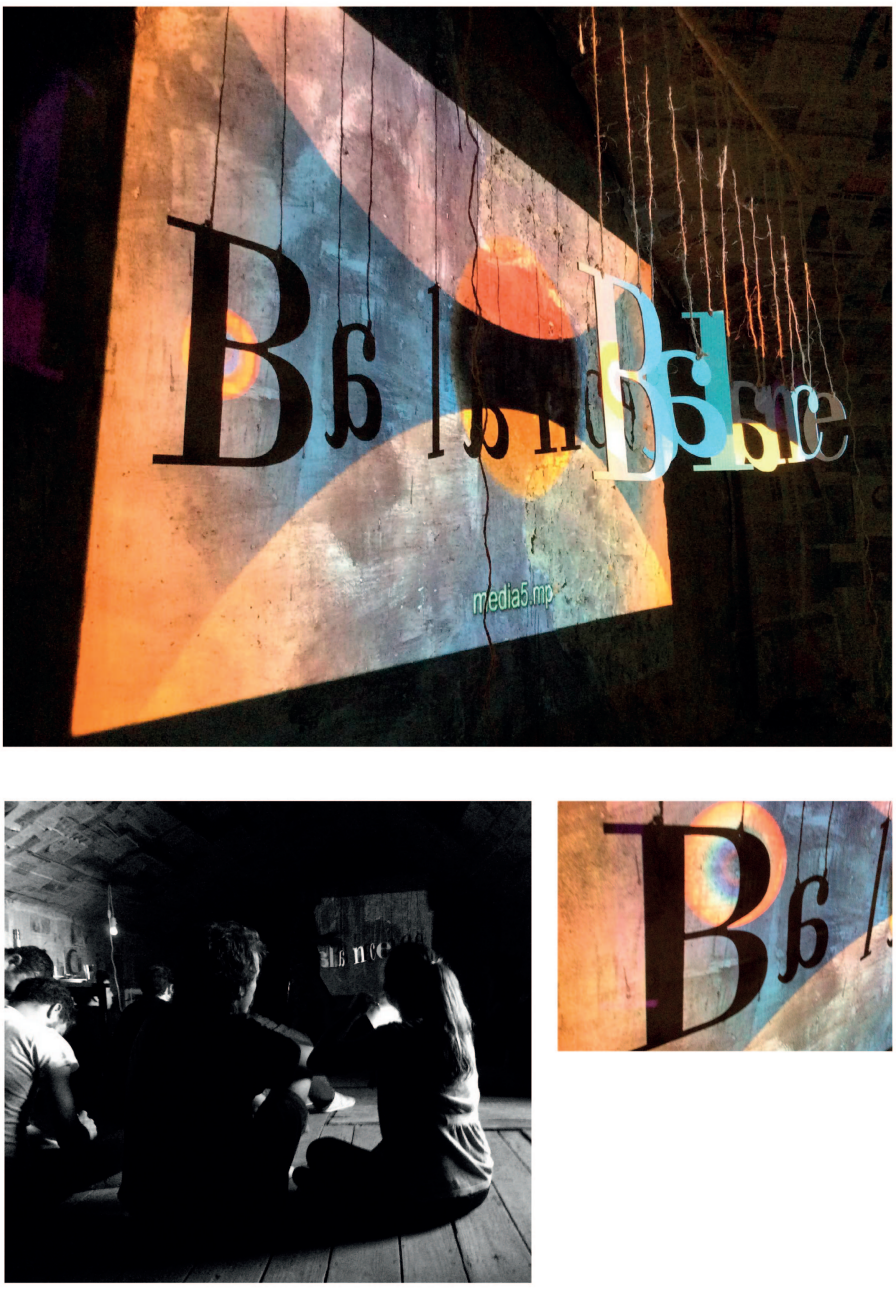


Figure 3.29: Presentation I

3.4.2 Changes to Multimedia

After presentation number I we got a lot of feedback regarding the multimedia. To improve the project and move on to the next presentation we decided to make some changes.

Following the recommendation to create a simpler multimedia we created multimedia II, which also has the concept of conflict but does not use any figures; it is simply a fight between the colours. Considering the symbol of balance is the middle of the screen, these opposite colours fight each other and try to push the other from the screen. At some point the colours start attacking not just from left to right or from right to left, but also from the top or the bottom of the screen. The storyboard for this multimedia is presented in **??**

Figure 3.30: Multimedia II

3.4.3 Presentation II

The second presentation was made at FAUL. The place was chosen according to similar criteria as for Presentation I:

- should be a public space
- audience should have an objective opinion
- should have a lot of space

Place FAUTL is an architecture and design faculty where it is common to have presentations and workshops on different topics.

Space of exhibition Though the university has an adequate place for presentations called White Cube, for this presentation we were looking for a more alternative and unique place. For this reason Espaço 24, a place where students can study and is open 24h a days, was the best possibility. It is always busy and has a collaborative atmosphere as the students work in teams to create their projects here.

Espaço 24 is in the ground floor of the building and is divided in the sections:

1. workspace
2. bathrooms
3. smoking space

For Presentation II we chose the smoking space. It is a unique space not just in architectural view. People go there to have a break so it has a less formal atmosphere. A cigarette break takes around five minutes, the same time as the multimedia, so you can easily watch and have your cigarette break.

Time Presentation was made on 11th of July starting at 19h and finishing around 22h.

Details of the presentation

- **Multimedia:** The multimedia was projected on a wall which had some notes and paint on it, but was mostly white and smooth so it did not have much influence on the multimedia colour or texture.

- **Movement of letters:** After Presentation I we noticed that the installation does not really move by itself even if the letters are connected with ropes. By experimenting the day before we noticed that in this new place there was also no air movement so we decided to use a ventilator. The ventilator blows air straight to the letters and makes them to move along with the reflected letters and the shadow letters.

- **Reflection of letters:** The reflected letters were visible mostly when it got dark outside. Walls on the right and on the left side were complicated surfaces (left wall was a glass wall and the right wall was a gate covered with a metal divider) so letters were mostly reflected on the ceiling.

- **Space:** The space was complicated but at the same time very experimental because all the walls were made of different materials. The left wall was a glass separating the space from the working space and the right one was a gate to the outside. The right wall was a good opportunity to see how it would work on an open space and the left wall an opportunity to see how the installation reacts with glass.

- **Glass wall on the left:** The glass wall had a much unexpected reaction to the installation. It perfectly reflected what was happening in the presentation space. Reflection was so real that it look that the same was happening in both spaces: smoking space and the working space.

- **Right wall of gates:** The wall on the right wall is a gate to the outside so there is fresh air and sun light all the time. To have a darker space

and a surface for the reflected letters we covered some part of the gates with a metal divider. On this divider there was reflected letters.

Questionnaire for participants Questionnaire is made of 9 questions, which help to understand the opinion of the participants and if the changes made after the previous presentation improved the project.

The questionnaire is similar to the questionnaire from Presentation I. Most of the questions are yes/no questions making it easier to answer and to compute the results.

1. **Age** - The average age of participants is 31 years old.
   Conclusions: We can guess participants are mostly working and having experience.

2. **Occupation** - 50% of the participants work with art. From these 50%, around 80% work in an architecture related field. *Conclusions:* Most of the participants are architects so we can expect useful suggestions on how to exhibit and choose the space for presentations.

3. **Are letters in shadow legible?** - 100% of participants said that letters are legible.
   Conclusions: Letters in shadow were clearly legible.

4. **Are reflected letters legible?** - 80% of participants said that reflected letters were legible.
   Conclusions: Letters were clearly legible.

5. **Is conception easily understandable?** - 75% of participants said yes, 8% said no and 17% answered that they do not know.
   Conclusions: Most of the participates understood conception. That makes us to think that the conception is easy understandable.

6. **Do you think multimedia makes installation more dynamic?** - 83% of participants said yes and 17% said no.

Conclusions: For most of the people multimedia adds dynamic to the installation. We conclude that multimedia makes the installation more dynamic.

7. **Which factors in installation make the strongest impression of dynamic?** -

   - multimedia - average evaluation 4,1
   - movement of letters - average evaluation 4,5
   - reflection of letters - average evaluation 4,5
   - interaction - average evaluation 3,25
   - other - 17% of participants filled this option with an average evaluation of 1

   Conclusions: The strongest impact was made by the movement of letters and the reflection of letters, which represents a significant improvement since last presentation. The weakest was the interaction, meaning we should try to improve it.

8. **Do you think dynamics makes installation to look more appealing?** - 100% of participants said yes.
   Conclusions: This question is the hypothesis of our dissertation. 100% of people gave positive feedback which means that they agree with the hypothesis of the dissertation.

9. **Recommendations** - Many of the participants gave oral recommendations, mostly on how to improve exhibiting space and how to make letters, shadows and reflected letters more legible.

Presentation II conclusions: The presentation space was very experimental and innovative. While making this presentation we had the opportunity to experiment with the glass reflections whose results were unexpected. The gate was an architecturally beautiful element of the presentation but as we need a completely dark space it did not help. The installation looked the best after 21h so we believe that in a space in contact with the outside this presentation should start after sunset. The shadow and reflected letters were legible and the conception understandable.

We got feedback considering multimedia to make the installation more dynamic and dynamic to make the installation more appealing. This supports our hypothesis. We noticed an improvement regarding the movement of letters and reflection of letters in comparison with presentation I. The interaction, however, was considered insufficient.

Figure 3.31: Presentation II a

Figure 3.32: Presentation II b

3.4.4 Presentation III

Fabrica Features Lisboa is a design objects store and an art gallery. Fabrica is originally based in Italy and famous for the campaign unHate[3]. Fabrica and the conception was exactly what we were looking for.

The third presentation was different from Presentations I and II. The participants had an open discussion between each other and the presenter and there were no questionnaires.

Space of exhibition We chose the darkest corner of the exhibition space in Fabrica. Special furniture, made to exhibit objects, was used to block undesired light.

Time Presentation was made on 30th of August starting at 16h and finishing around 19h.

Details of the presentation

- **Multimedia:** The multimedia was projected on a wall which was perfectly white and straight.
- **Movement of letters:** The space had some installed ventilation which created a slight movement of the letters all the time.
- **Reflection of letters:** Reflected letters were visible but not very bright because of the light coming from the outside.

Conclusions: The space was visually fitting all the concept of the project. It was too bright to properly reflect the letters. In general the installation worked very well visually and that compensated the problem with brightness.

[3] `http://unhate.benetton.com/`

Figure 3.33: Presentation III a

Figure 3.34: Presentation III b

3.5 Synthesis

In the Experiments section we decided which would be the components of our installation, namely Plexiglass letters, a multimedia projector and a loose pole on where to hang the letters.

In the Conception section we present our conception for the installation. The idea of a conflict and the way to solve it was inspired by the analysis done on the State of Art chapter.

We present a fully detailed description of the multimedia in the section Multimedia of Project. Namely we give a full account of why we chose those specific shapes, colours and composition. We also describe the Plexiglas letters and the process used to create them.

In the Promoting the Project section we describe how we got to the logo, social media and posters used to promote our installation and presentations.

The presentations, documented in the Presentations section, allowed us to collect a lot of feedback and gather valuable insights. Presentation I was surprising as the old wall which served as a background created a surprisingly positive effect. Presentation II was done in an experimental and interesting space which gave us new ideas such as using other material like glass, even though the sun light prevented the installation to show its full impact. Presentation III was done in the best of the three locations. The exhibiting space was good; though there was a natural light source the multimedia was visible and the installation fit with the conception of gallery.

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Conclusions

This work has produced satisfactory results regarding the objectives we have proposed to achieve.

The analysis presented on chapter 2 provided us with crucial orientation on how to develop our installation and conception. An overview of classical art works by the likes of Duchamp and Ascott allowed us to understand the

primordial reasons for interactive art and its appeal. Modern works, like Rozendaal's or Jansen's, pointed the way forward and inspired us to keep pushing the existing boundaries. Picabia, Helion and others were the main contributors for grasping the concept of Balance and ways to represent it. On the more technical side, works by Eerdekens gave us an excellent starting point from where to start our experiments with the installation shape and materials.

Experiments helped us not only to find a suitable form, but also the best materials to present our idea of Shadow Graphic. During these experiments we found out that the best material to make letters is Plexiglas. We chose it as it is a good surface for multimedia, it is light and we had the option of choosing various colours.

As for the light sources we opted to use the light of a multimedia projector. We made a multimedia with the topic of conflict with specific colours and shape to represent the evolution and tension of a conflict. After experimenting with audio we concluded that it would take the audience's attention away from the multimedia and shadows so we decided not to use it.

Experiments showed that the multimedia is not disturbing the legibility of the letters and it even makes the Shadow letters more visible. An interesting reaction between the light of projected multimedia and Plexiglas letters was found in one of our experiments. The multimedia was projected on the Plexiglas letters and at the same time these letters, as long as they were moving, were reflecting it and so filling the space with random reflected letters with multimedia inside them.

Having the topic of Conflict and Balance as a nuclear concept, we opted for a font that would be historically associated with balance. We chose Bodoni for its relationship with human being and history.

To understand whether the installation is appealing and what changes we should make we have done three presentations. These presentations and the feedback we got led us to many new inspiring ideas. These presentations took place in very different places: the first one in an artists' residence, the second

in a university and the third one in a graphic design studio/shop/gallery. This was the way to understand what were the ideal conditions regarding the exhibition place.

Presentation I had all the conditions to create a bright multimedia projection but the space was too complicated so the reflected letters were not visible at all times.

Presentation II was done in an almost open space. One of the walls was a gate to the outside and the other one a glass separating the space from an auditory. Though there were no the best conditions for the multimedia projection, the installation fitted the space and once the sun light disappeared the multimedia and reflected letters were easily visible and legible. The feedback from the audience strongly supported our hypothesis that dynamics makes the installation more appealing.

Presentation III was made in a space specially designed for exhibiting art so it had all the conditions to see the multimedia and the reflected letters, though there was some sun light. The space visually fitted the installation as it was a white, clean and modern gallery.

The feedback from Presentations I and II was collected in questionnaires which helped us to improve some factors such as interaction, understanding of conception, legibility and multimedia interactivity.

In the presentations period we decided to apply for the international light festival BEEpositive and we were accepted. This project is going to be presented in the festival this October. Making public presentations and attending international festivals gives us the opportunity to deal with this project not just theoretically but also practically in existent projects.

Our installation managed to keep the attention of the audience. People were curious and our project made them to understand the conception and to think about new ways of displaying, presenting or even using Shadow Graphic.

This is a new sphere where we can apply graphic design. We hope to provoke more innovative, artistic and professional advertising. At the same

time our installation can be interpreted as a piece of art. If this project is presented in an art contest or exhibition and provokes in the audience an interest in graphic design as a art, it will serve the purpose of making graphic design more popular.

One of the big challenges faced in this project are the very specific conditions of the exhibiting space. If there is unwanted light, no movement or even if the space is not big enough, the installation does not work as it should; we cannot see multimedia clear and it is hard to see the reflected letters.

In conclusion, we have answered our research question positively. Our hypothesis stood the test and this was clearly expressed in the feedback collected from the audience. It is possible to create a dynamic light installation transmitting a clear, legible and appealing message. Both the physical dynamic (movement of the letters) and the mood of dynamic provoked by the multimedia made the installation more appealing and interactive and did not affect the legibility. We conclude that dynamic does make the installation generally more appealing and helps capturing the attention of the audience, shown by the number of suggestions and discussions it generated. This shows we are dealing with an inspiring and not yet fully explored technique, making us to wonder what the future works will be like.

Future studies

This project is one more step in the studies of shadow and multimedia. Some of the paths that can be further explored include

1. sounds of colour
2. 3D printing

Sound of colour regards the project of Neil Harbisson which could inspire and help make a more complex project and a more appealing installation. 3D printing presents itself as a powerful new way of creating more complex objects to project the shadow.

5.1 BEEpositive

Beepositive is an international light installation festival taking place in Lithuania on 11th October 2014. This festival attracts artists from all around Europe and anyone interested in the topic. We applied for participation in this festival and we got a positive feedback.

First of all we needed to find the best way of presenting the installation. It was decided to build the installation on the outside but, in order to create a surface for the multimedia and letters, we are going to use a white tent. We considered four ways of using tent:

1. three walls without roof
2. three walls with roof
3. four walls without roof
4. four walls with roof

Though a final decision is not yet taken, our suggestion for the organizers was to build a tent with three walls and roof, creating the effect of a light box. The installation will be displayed not far from a forest, in an impressive and attractive mix of nature and multimedia. It will not be closed so that it would attract the audience to come in.

Figure 5.1: BEEpositive, *International Light Installation Festival,* picture, 2013. http://manofestivalis.lt/naujiena/tarptautinis-sviesos-instaliaciju-festivalis-kviecia-sviesti-kartu/292.

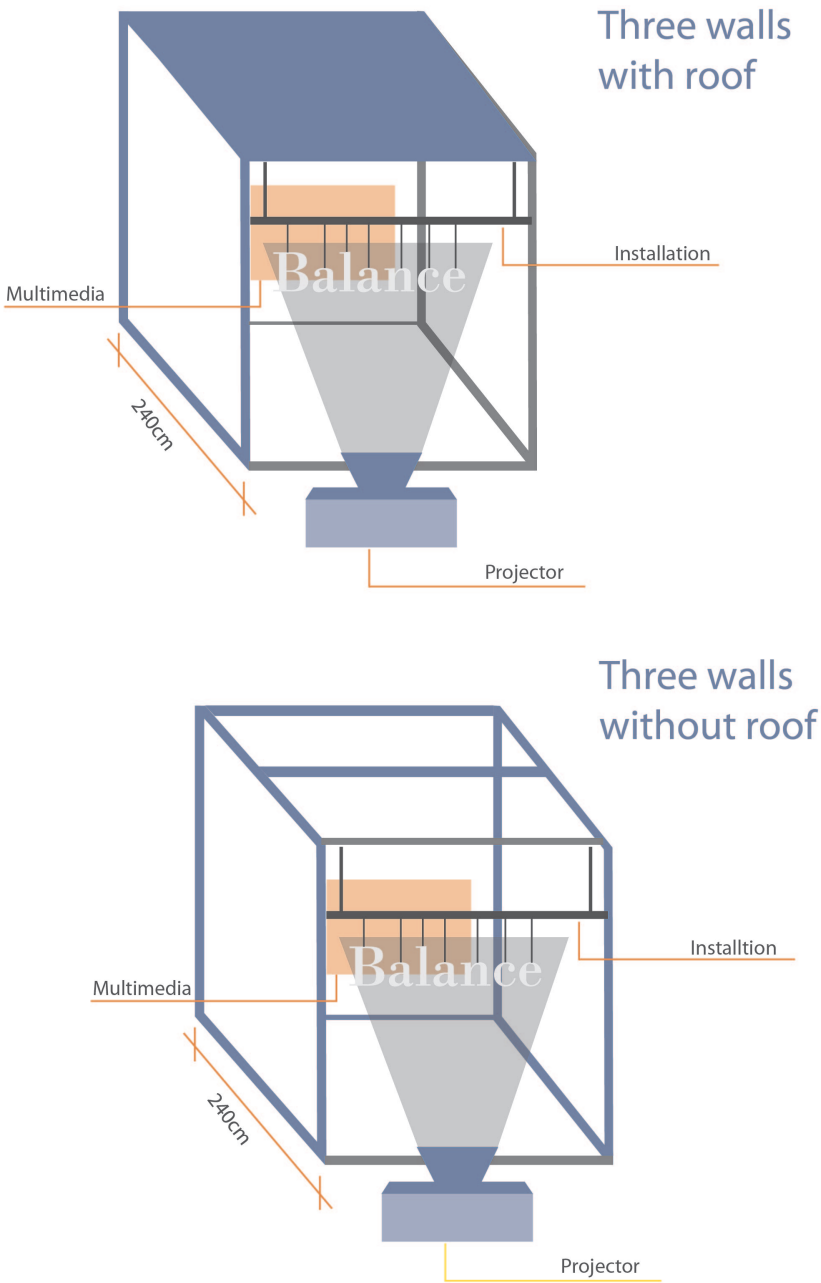

Figure 5.2: Proposals with three walls

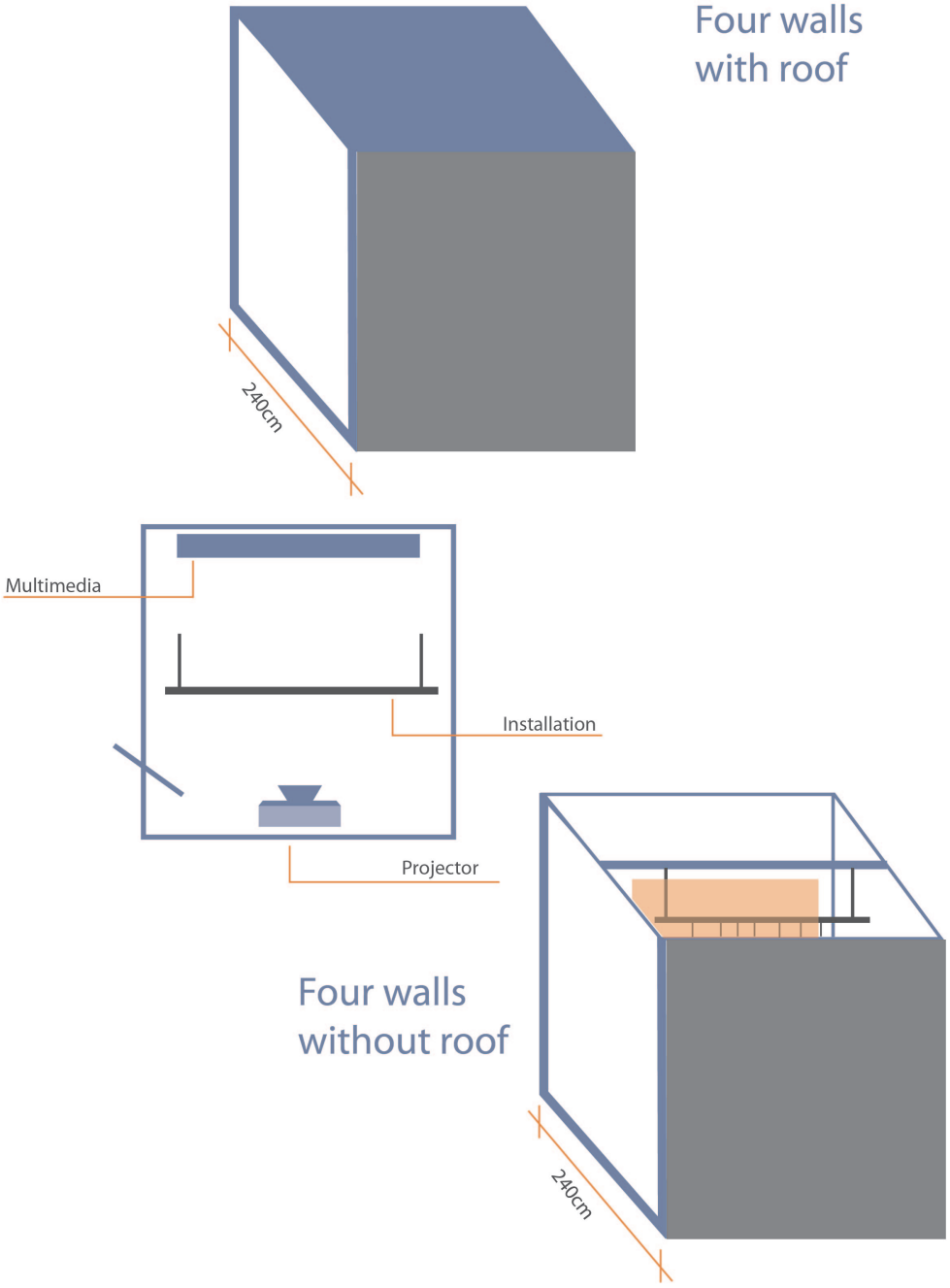

Figure 5.3: Proposals with four walls

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Annexes

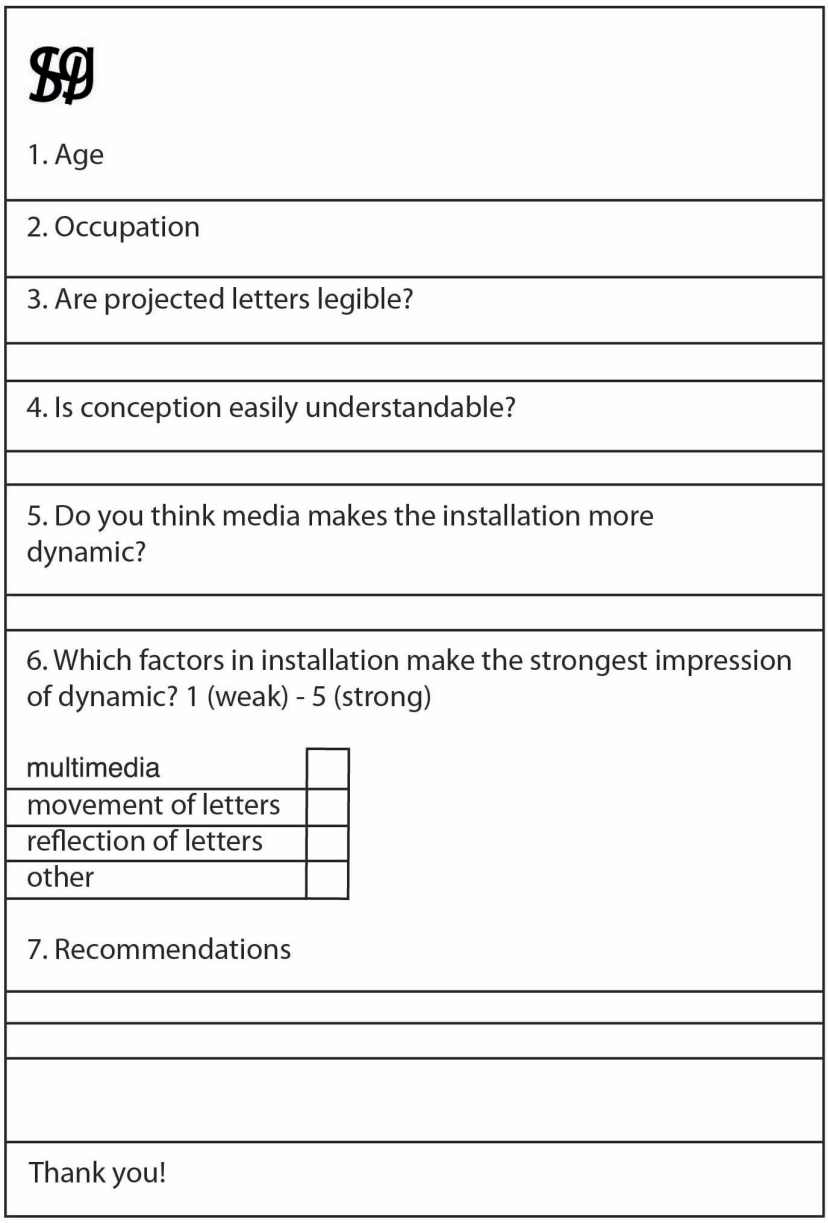
Glossary

- **Artist residents** - an organization which works together with artists, providing conditions for hosting, developing and presenting projects.
- **Ascender height** - the portion of a minuscule letter in a Latin-derived alphabet that extends above the mean line of a font.
- **Baseline** - the line upon which most letters are and below which descenders extend.
- **Cap height** - the height of a capital letter above the baseline for a particular typeface.
- **Capital letter** - also know as upper case letters: A, B, C...
- **Composition** - the plan, placement or arrangement of the elements of art in a work.
- **Dada** - art movement of the European avant-garde in the early 20th century. The movement primarily involved visual arts, literature, poetry, art manifestos, art theory, theatre and graphic design, and concentrated in anti-war politics. In addition to being anti-war, Dada was also anti-bourgeois and had political affinities with the radical left.
- **Descender** - the portion of a letter that extends below the baseline of a font.
- **Experiment** - is an orderly procedure carried out with the goal of verifying, refuting, or establishing the validity of a hypothesis. To carry

on experiment we need to create specific conditions for the object we are working on.

- **Followers** - term used to refer to people who follow news about your posts in social media.
- **Font** - a particular size, weight and style of typeface.
- **Fragment** - a specific chosen piece of an art work, which can be analysed by itself.
- **Letter** - a written element of an alphabet.
- **Lower case letters** - is the distinction between the letters that are in larger upper case.
- **Mean line** - half the distance from the baseline to the cap height.
- **Participant** - a person who attends an event or presentation and gives his opinion/feedback regarding it.
- **Plexiglas** - a material also know as Acrylic, similar to plastic.
- **Pixel** - the smallest controllable element of a picture represented on the screen.
- **Proportion** - describes the relationships between elements of a design.
- **Shadow** - an area where light from a light source is obstructed by an object.
- **Three-dimension printing** - a processes for making a three-dimension object under computer control.
- **Typeface** - also know as font family, it is a set of one or more fonts composed of glyphs that share common design features.
- **Typography** - the art and technique of arranging type to make written language.

Questionnaires for Presentations



1. Age

2. Occupation

3. Are projected letters legible?

4. Is conception easily understandable?

5. Do you think media makes the installation more dynamic?

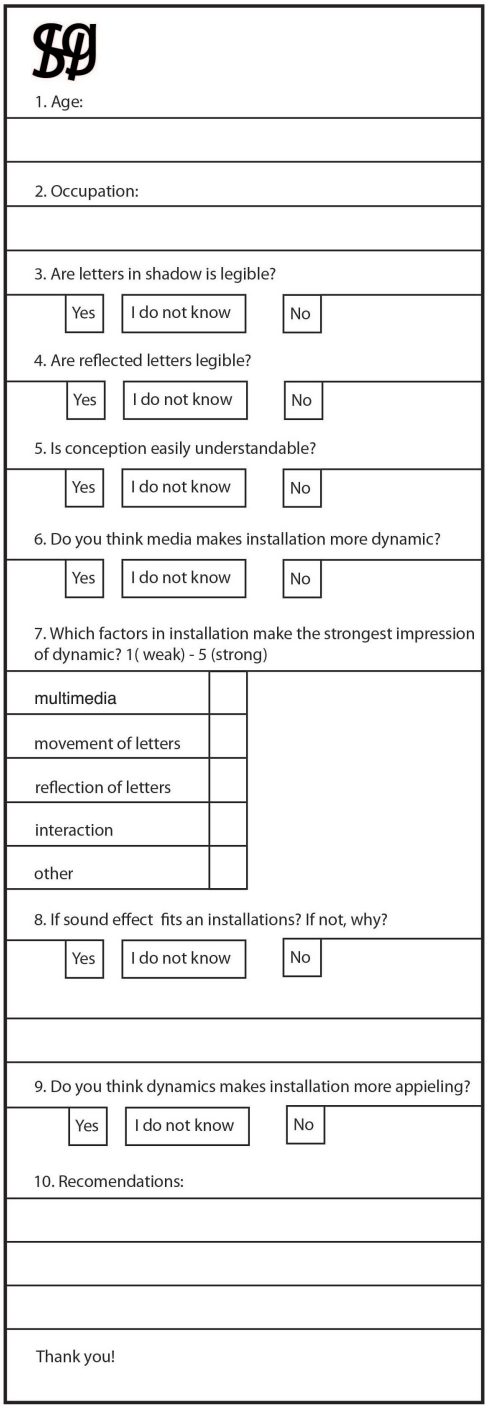
6. Which factors in installation make the strongest impression of dynamic? 1 (weak) - 5 (strong)

multimedia	
movement of letters	
reflection of letters	
other	

7. Recommendations

Thank you!

Figure B.1: Questionnaire 1



1. Age:

2. Occupation:

3. Are letters in shadow is legible?

Yes | I do not know | No

4. Are reflected letters legible?

Yes | I do not know | No

5. Is conception easily understandable?

Yes | I do not know | No

6. Do you think media makes installation more dynamic?

Yes | I do not know | No

7. Which factors in installation make the strongest impression of dynamic? 1(weak) - 5 (strong)

multimedia	
movement of letters	
reflection of letters	
interaction	
other	

8. If sound effect fits an installations? If not, why?

Yes | I do not know | No

9. Do you think dynamics makes installation more appieling?

Yes | I do not know | No

10. Recomendations:

Thank you!

Figure B.2: Questionnaire 2

Presentations II and III extras


Tomorrow in this space
there will be a presentation.
We thank you for keeping the space
clean and not touching installation.
Thank you
Amanhã, neste espaço, haverá uma
apresentação. Agradecemos que
mantenham o espaço limpo e
não toquem na instalação.
Muito obrigado


SHADOW GRAPHIC/ BALANCE
An MA project based on experiments.
The hypothesis of the project is that Dynamics
makes the installation look more appealing
and helps to capture the attention of audience.
The installation is composed by these parts:
1. surface
2. media
3. typographic form to shape shadow
4. shadow
Concept of installation:
Conflict situations between humans or between a human and an object may be started by
little or even insignificant impulse.
We chose a media simulation to present the tension in growing conflict.
In front of the media the word Balance appears, projecting a shadow on the surface. It
shows how in a conflict situation the notion of balance goes in the background, allowing
the situation to go out of control and creating a contrast with the disorder that surrounds it.
Experiment/ questionnaire
The event is for presenting the installation. After the presentation
the participants would answer a simple questionnaire.
Discussion is welcome!
Questionnaire would help to understand if the main objectives of
project were reached.
Place
FA UL, espaco 24
Time
11th of July, Friday
from 19h to 22h

SHADOW GRAPHIC/ BALANCE

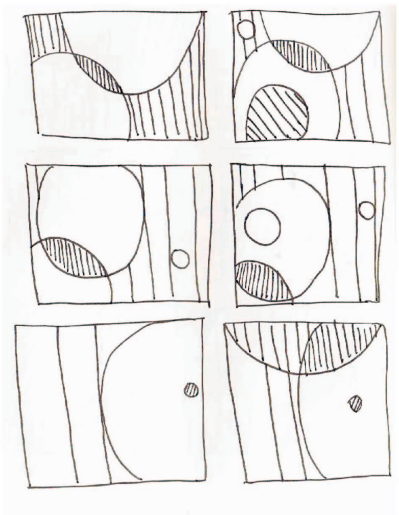
The topic for this installation is Conflict. Nowadays people live their lives constantly facing conflict situations. These situations are hard to control and hard to solve. They are often provoked by little or even insignificant impulses and frequently are blown out of proportion, with stress and preoccupations making everything worse. We felt the need to address this topic and to depict it as the complex interaction it is.

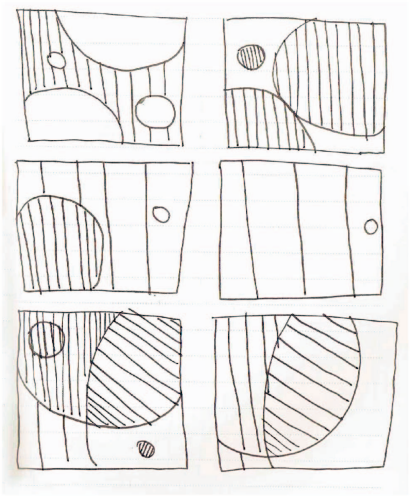
The evolution of the conflict is depicted on the projected multimedia. The conflict impulses are represented by figures. We used little circles for the initial impulses, often insignificant, and sharp triangles for the bigger, more active impulses. The speed of the figures also represents how passive/aggressive they are. When figure clash, they create more impulses and increase the intensity of the conflict. The colours of the multimedia represent the intensity of the conflict and also of each of the parts. We notice that conflict generates more conflict and the figures move on, change shape and they could be like this forever. In order to stop the conflict, the opponents should keep the balance and not to attack each other.
Balance, in our case, is the solution to the conflict. Balance is a popalar concept in many subjects like religion, philosophy or even biomechanics, where they have very specific and meaningful definitions. In the Aztec philosophy, balance was seen as the right way of living life, providing the necessary stability in an ever changing world. In biomechanics it is the ability to maintain the line of gravity and balance exercises are often used in physical therapy with patients who suffered strokes. In conflict, balance might be confused with passivity but its strength is stronger than that of the conflict. The problem is whether the opponent will be using it too.

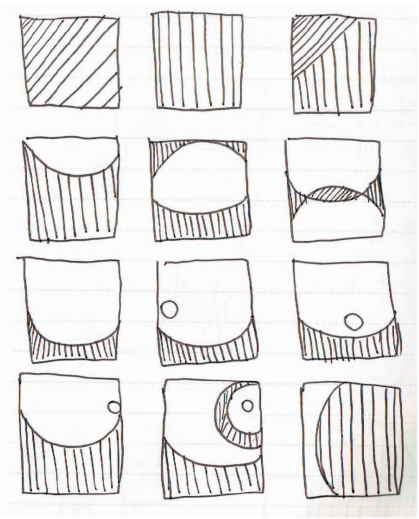
The typeface chosen for the Plexiglas letters had to represent the concept of the work so we chose a font related to balance. We had two ways of choosing this: we could go for the most visually balanced for or for a font which was historically most balanced. We decided to go with the second criteria because the installation tells the story of conflict and typefaces also have a history and a contact with humans. We chose Bodoni, a serif font with a great history, created by Giamattista Bodoni in the 17th century. It is a classicist, romantic and calm font, prefect to represent the concept of Balance.

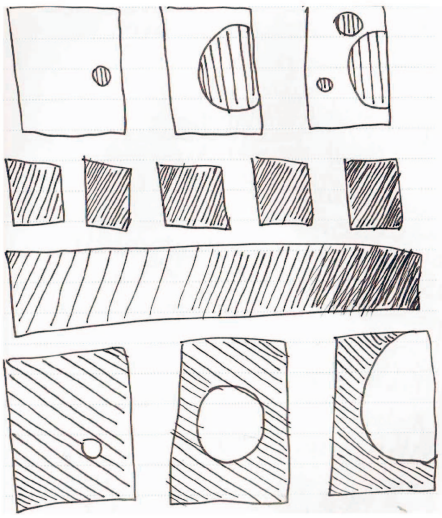
The installation has the Plexiglas letters placed in front of the multimedia, projecting their shadow on the multimedia. The projected shadow, spelling the world Balance, represents how in a conflict situation the concept of balance is forgotten and left in the shadow, the background. The projection that can be seen on the Plexiglas letters themselves shows how the concept of Balance is actually derived from the concept of Conflict. Balance is a solution that rarely is remembered.

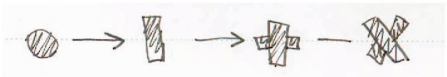
Sketches

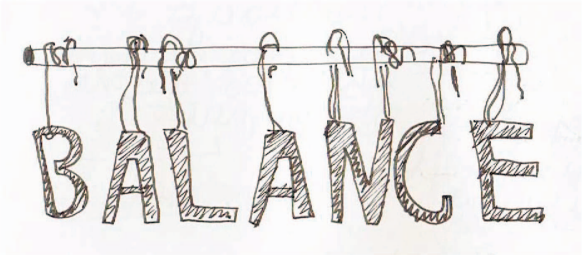








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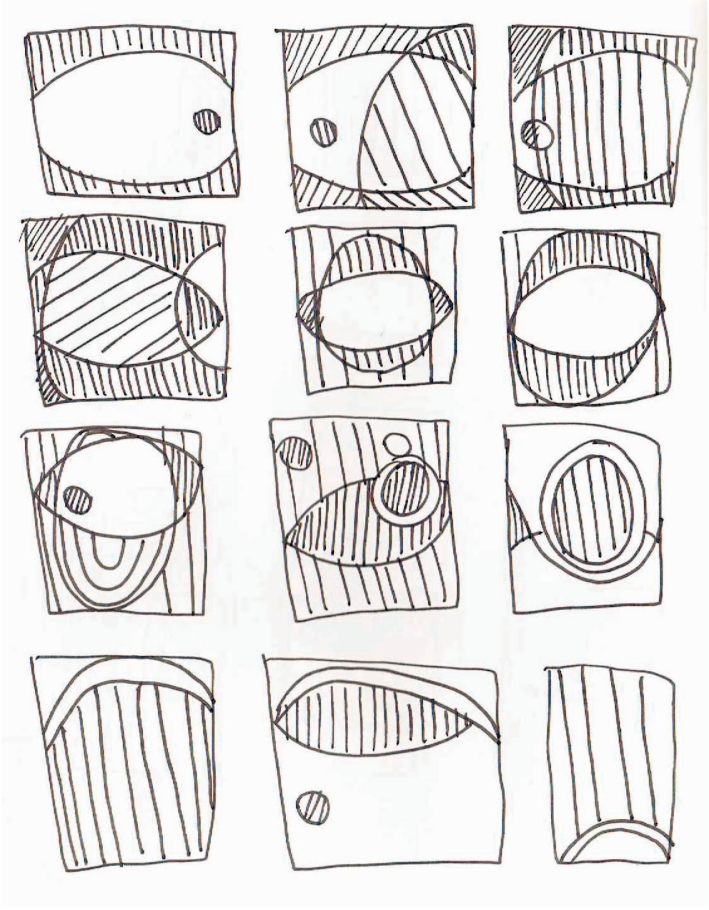

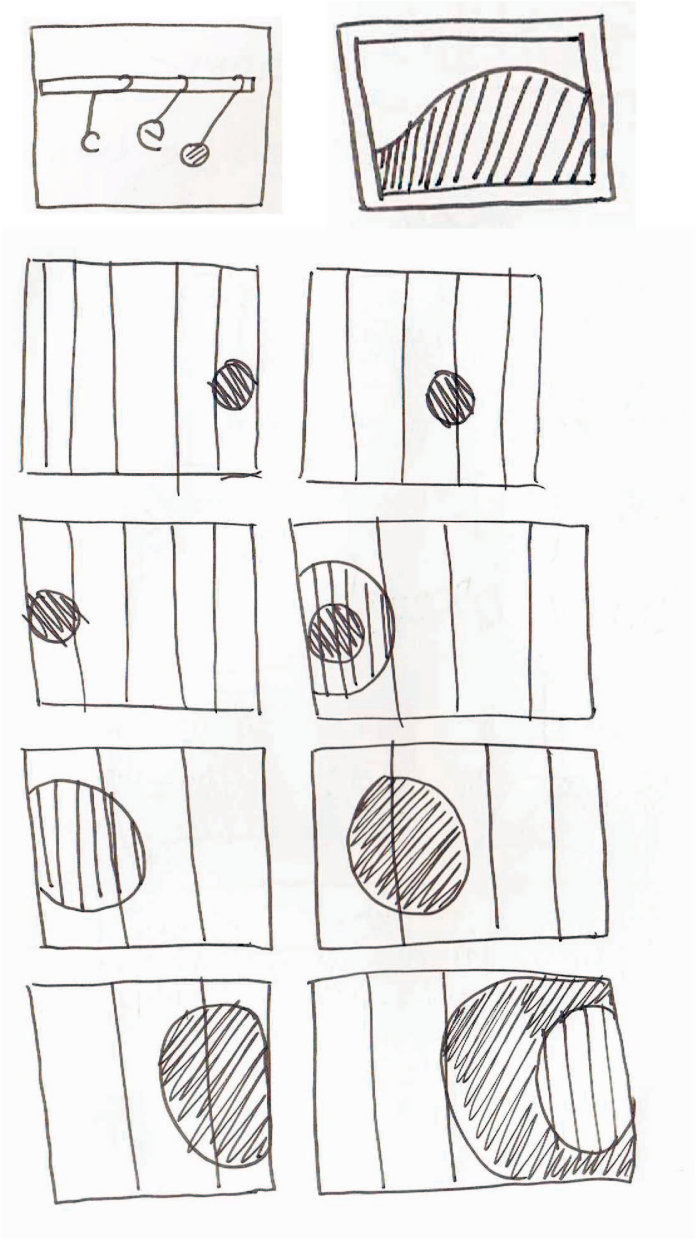

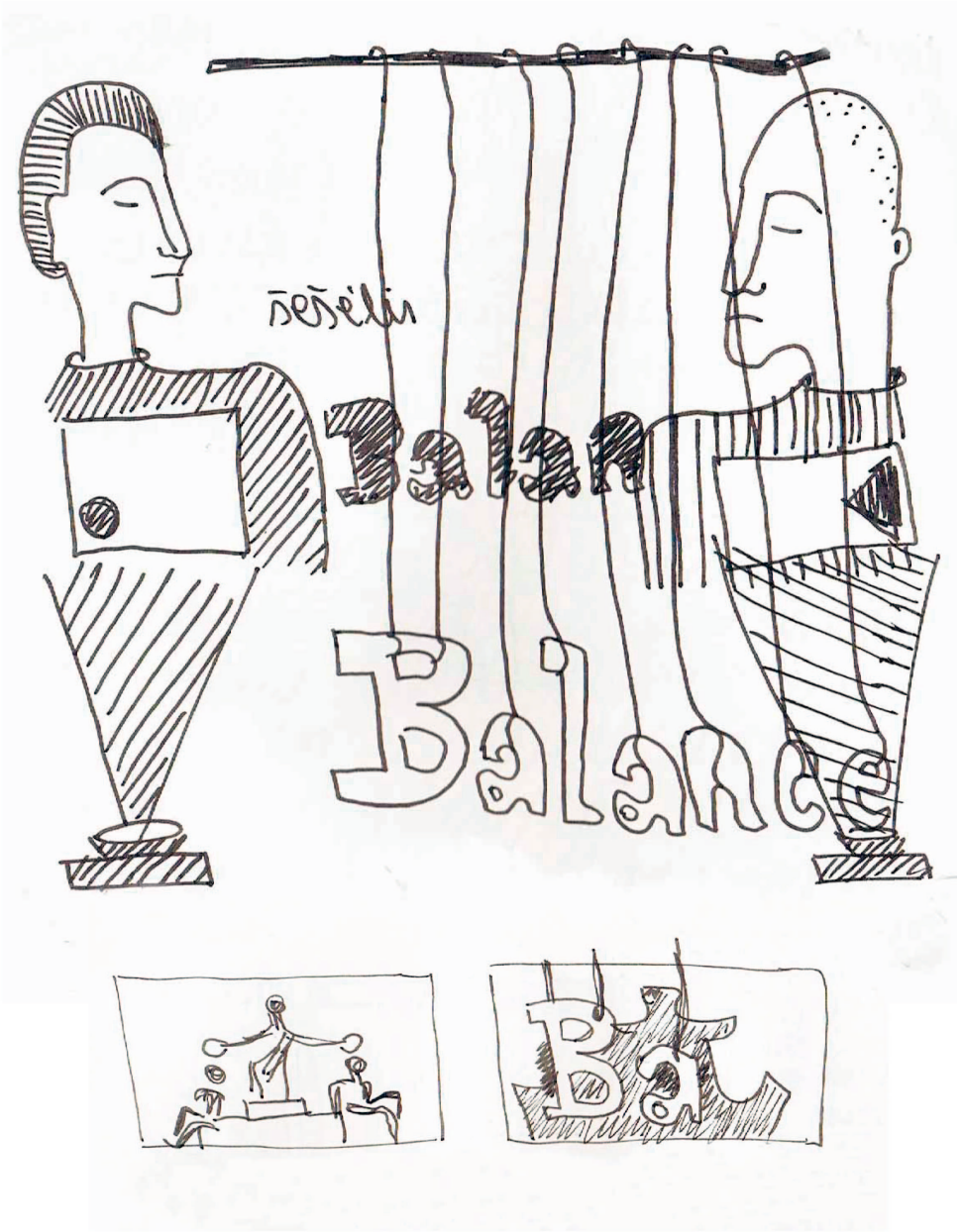
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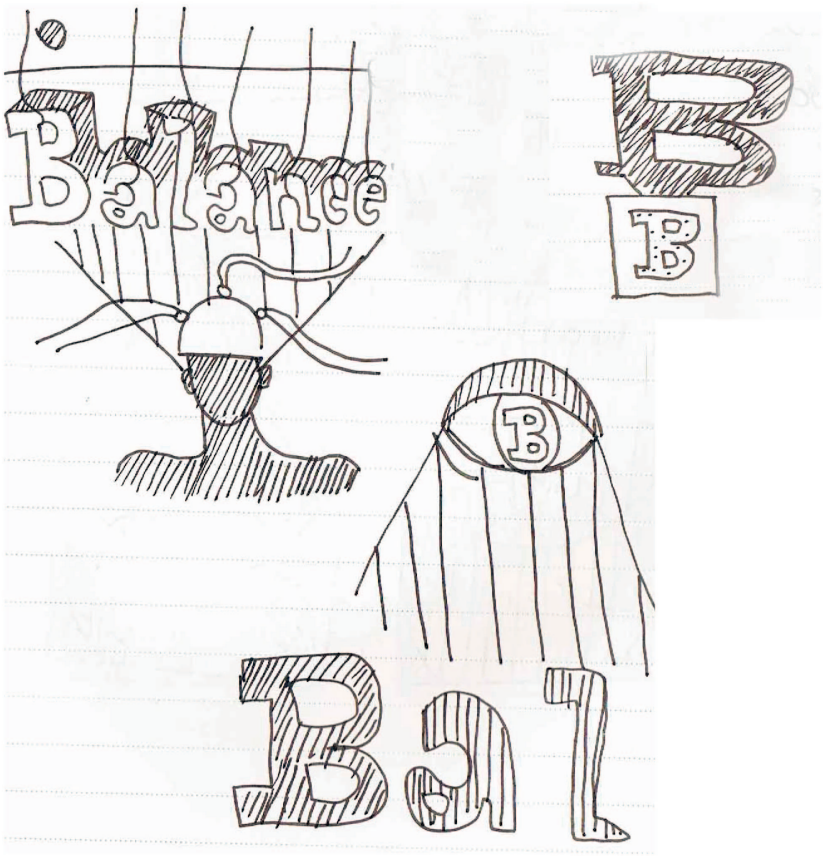
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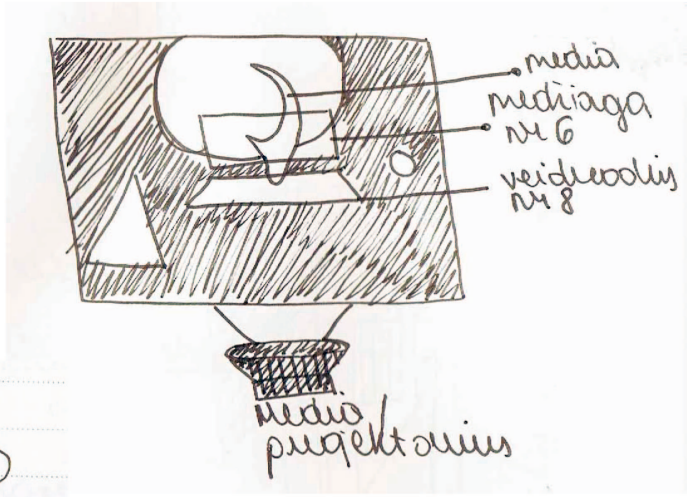
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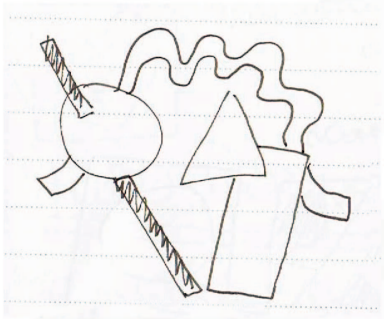

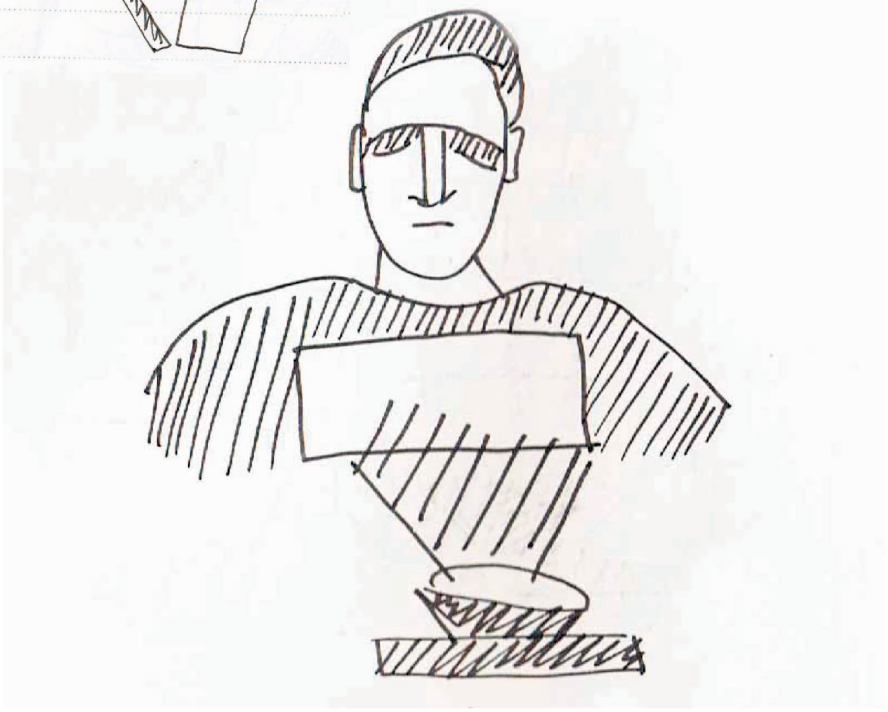

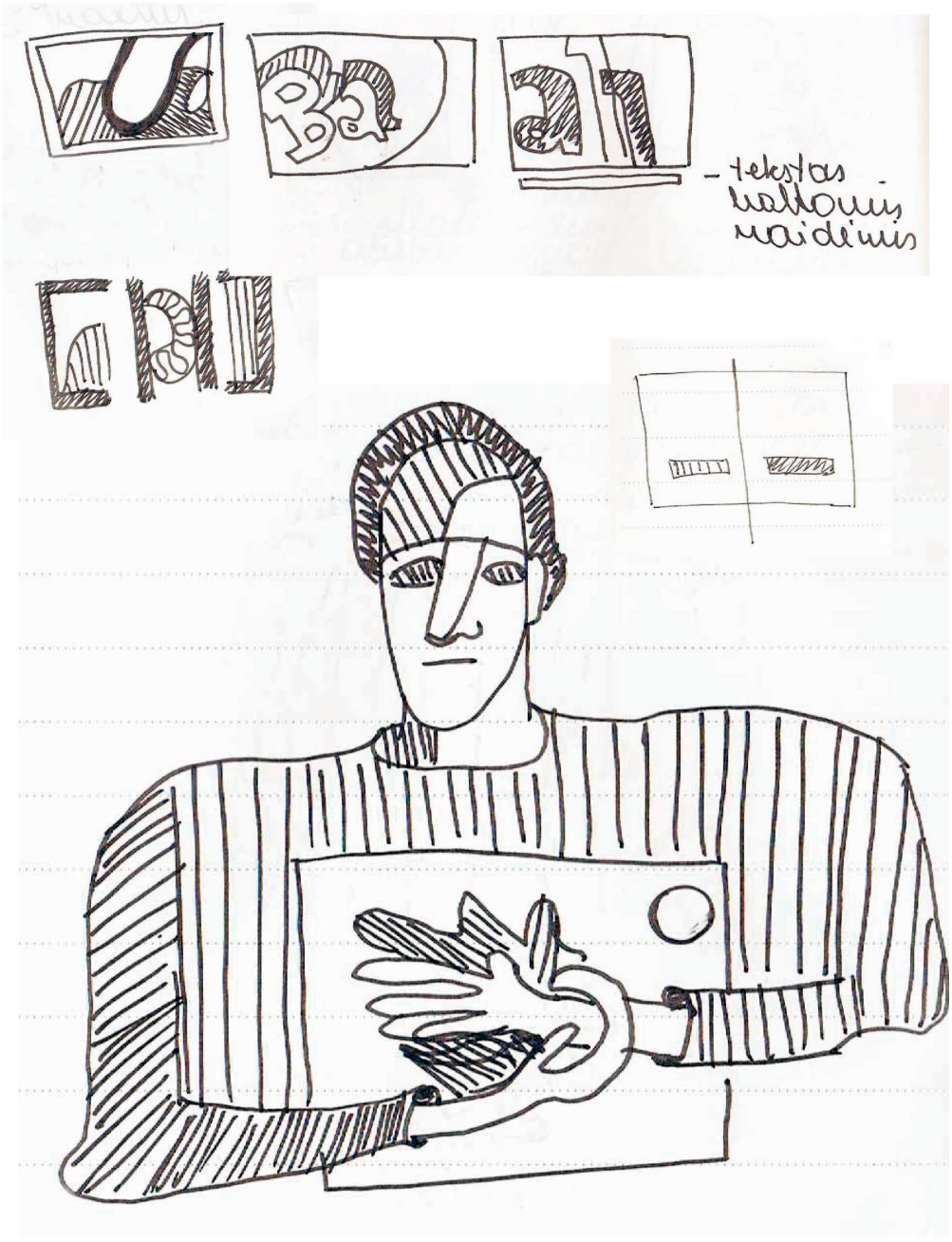
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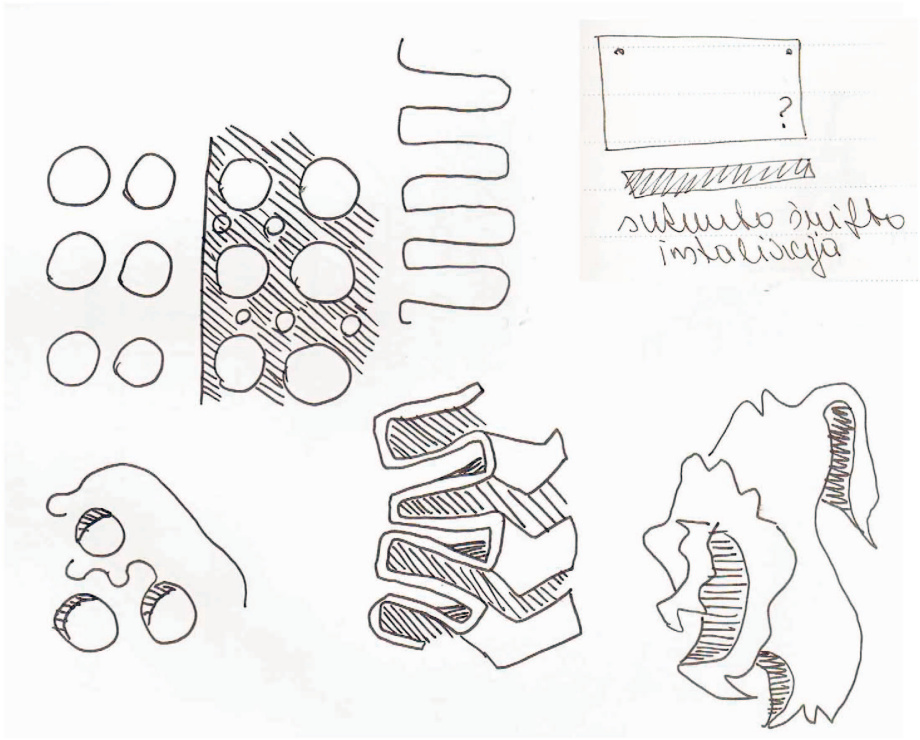
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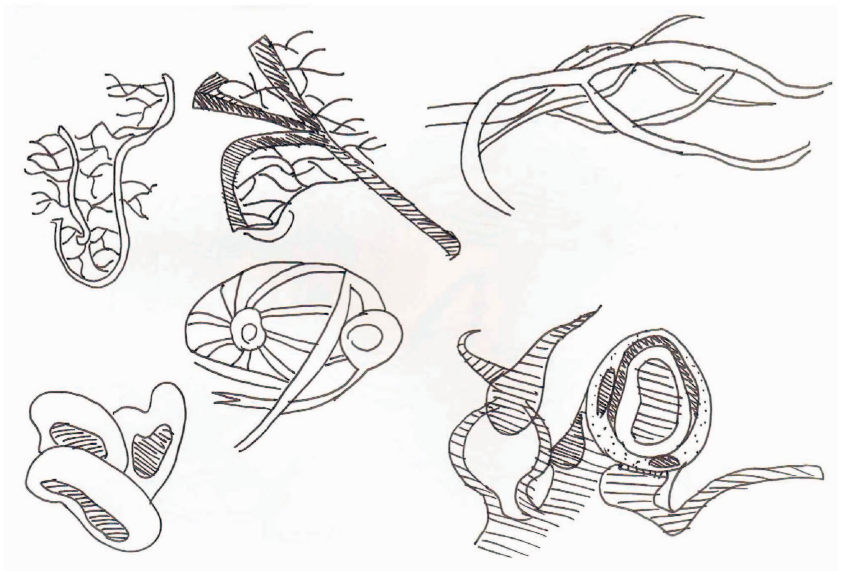

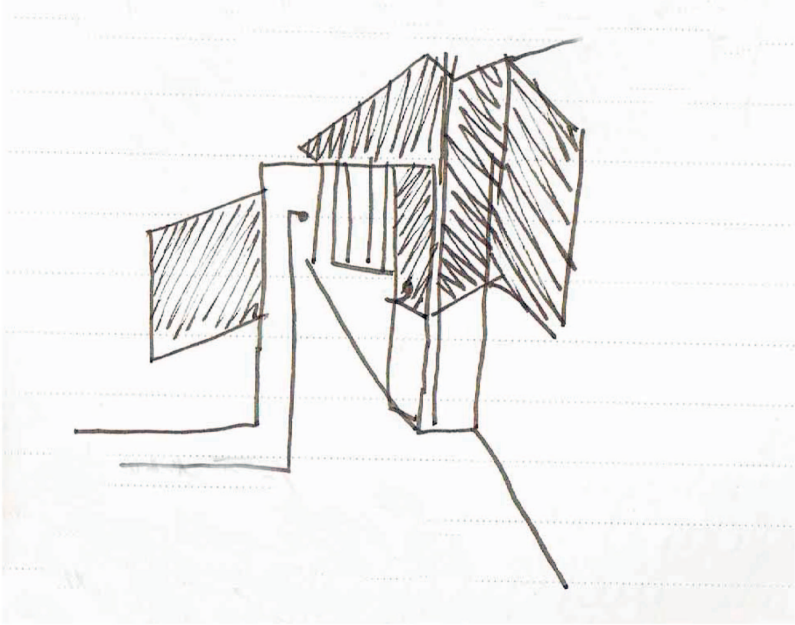

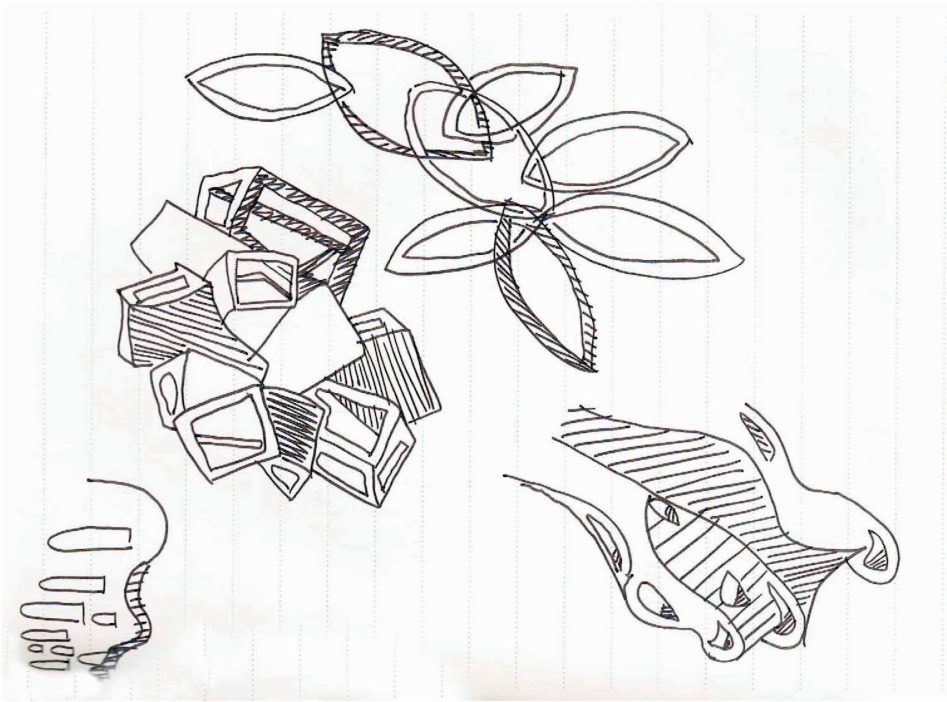

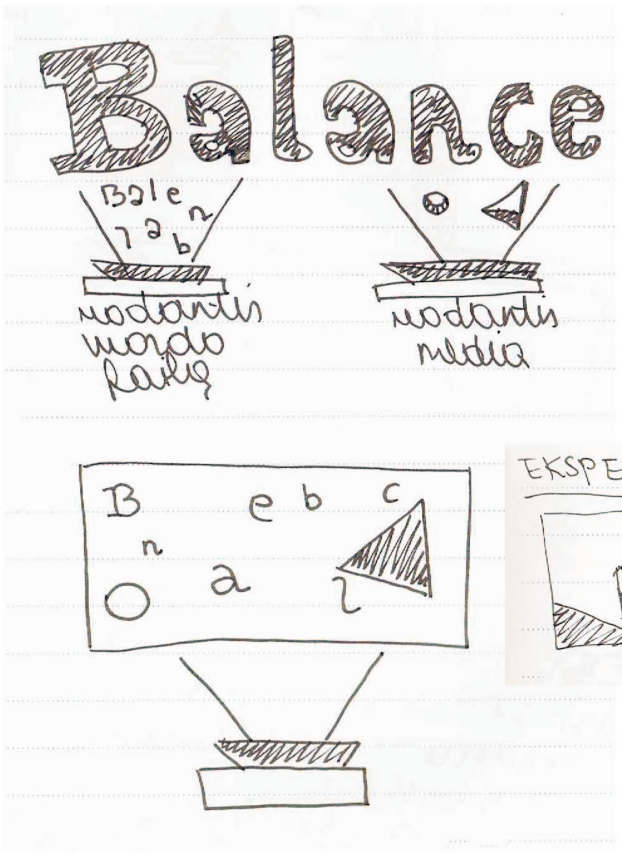
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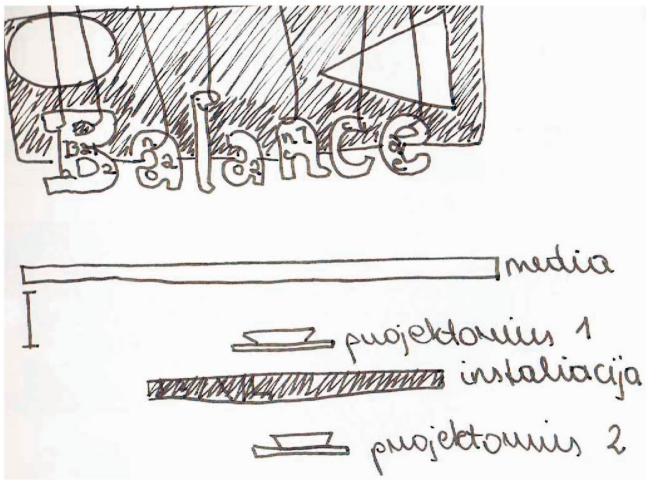
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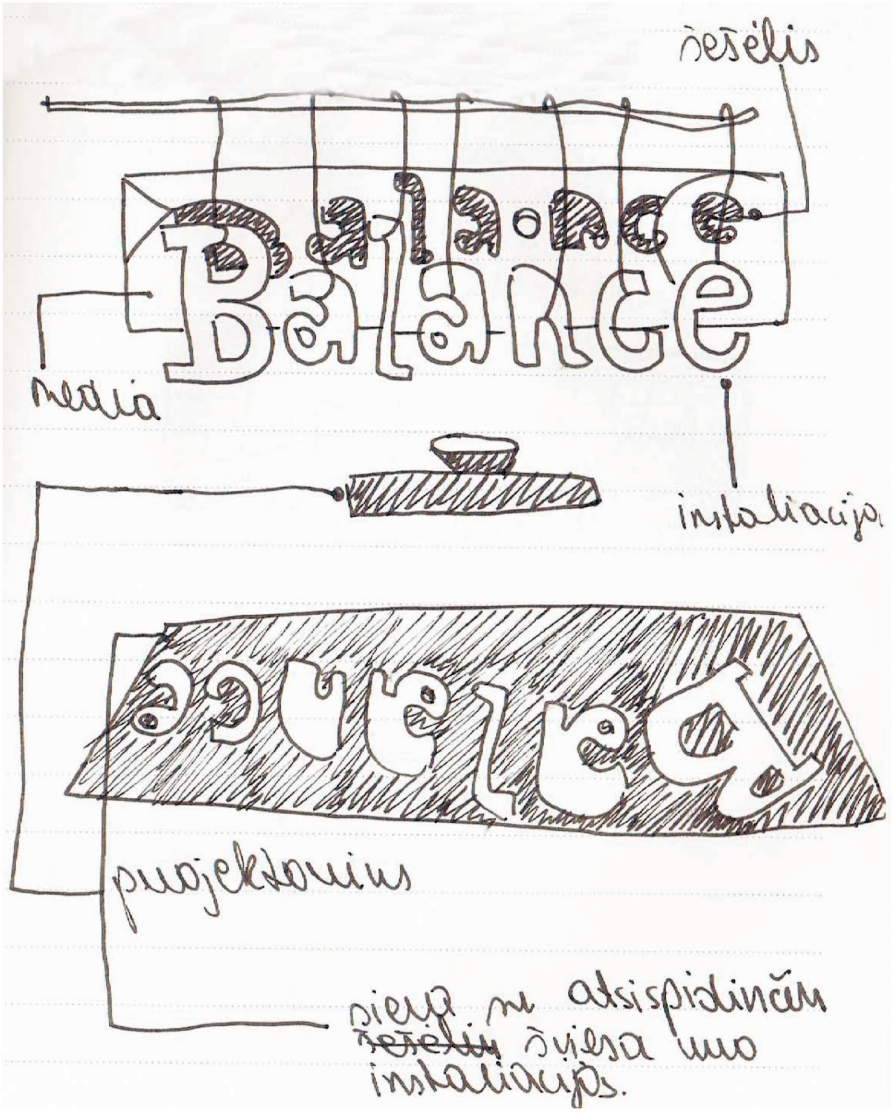
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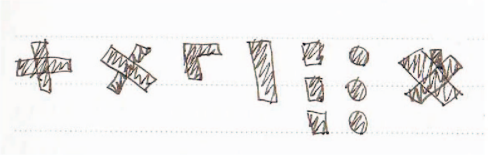

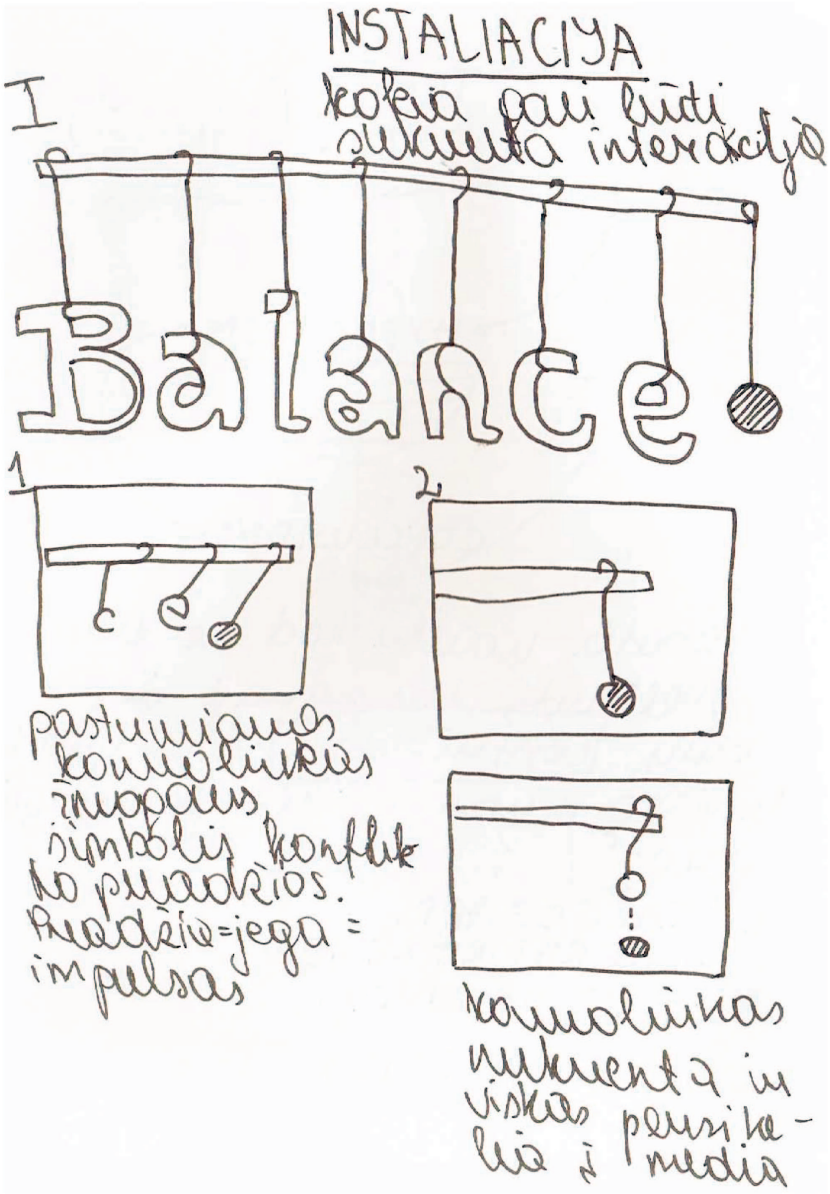
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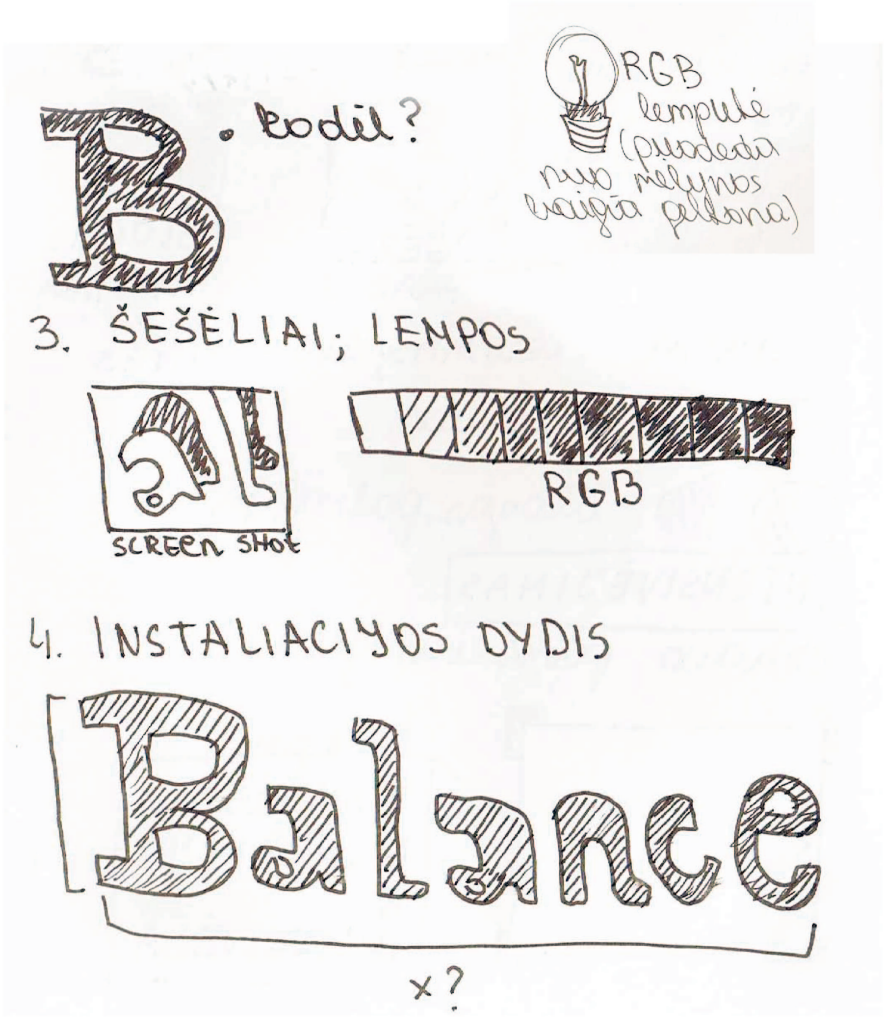
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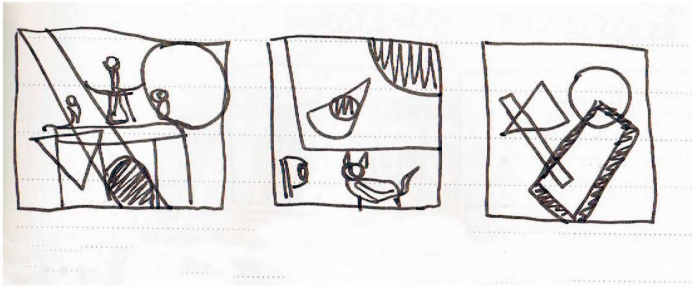
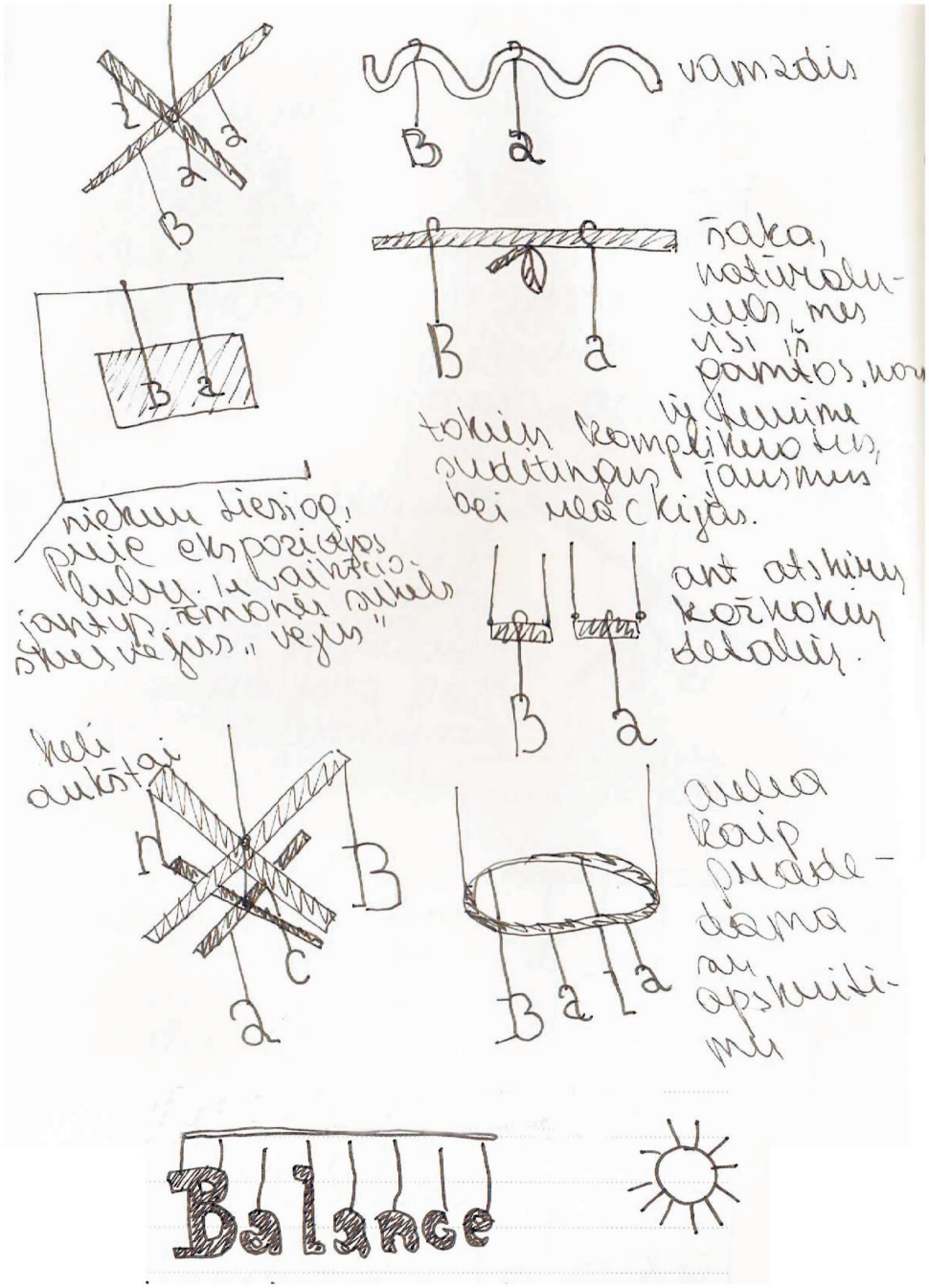
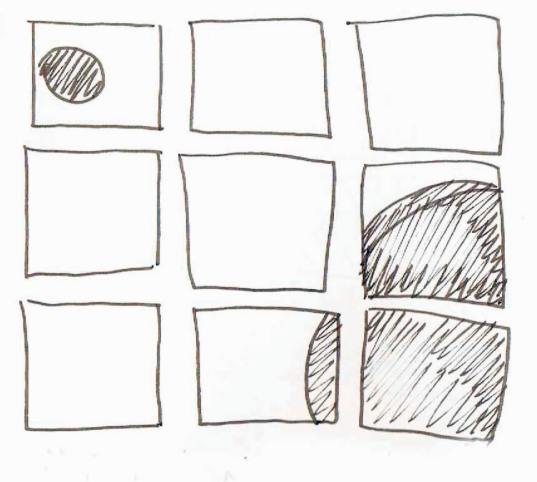
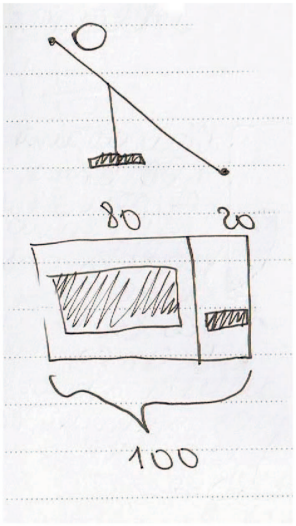
Balance
x?




vamzdis
šaka, natūralumo, nes visi iš pamatos, nors ir kuriame tokius komplikuotus, sudėtingus įrašus bei mačkijas.
ant atskirų kojelių.
kelių aukštai
arba kaip praktiškiau ar apskritimu
Balance

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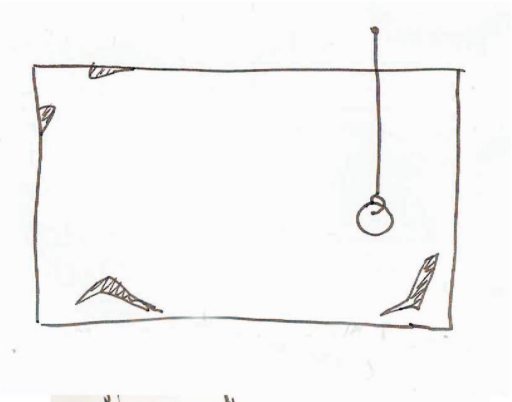
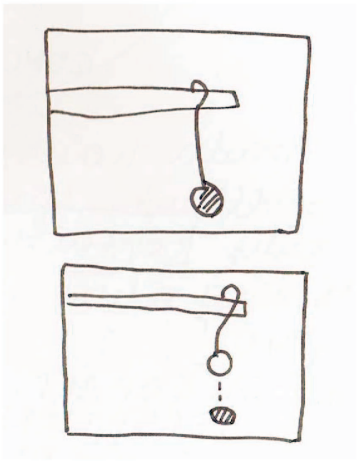
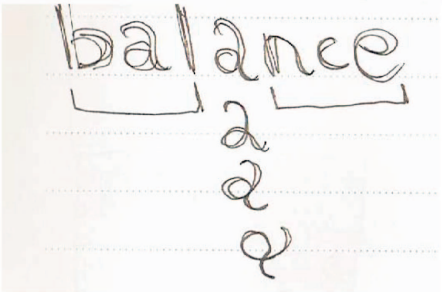
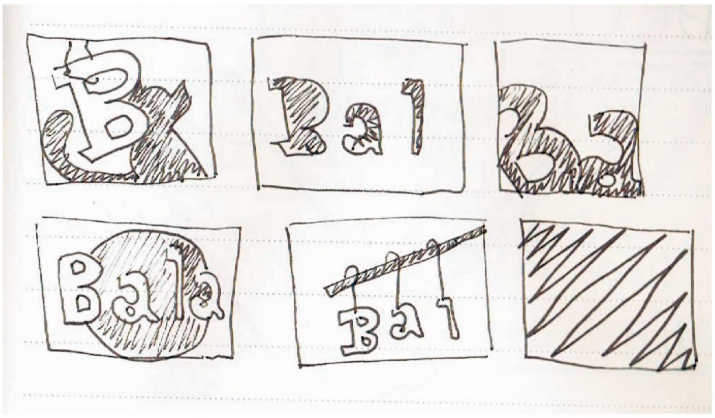
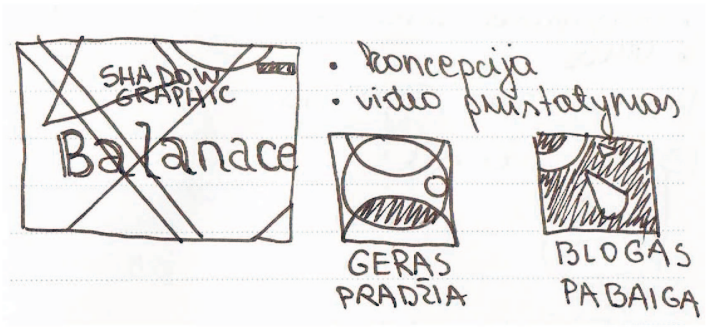
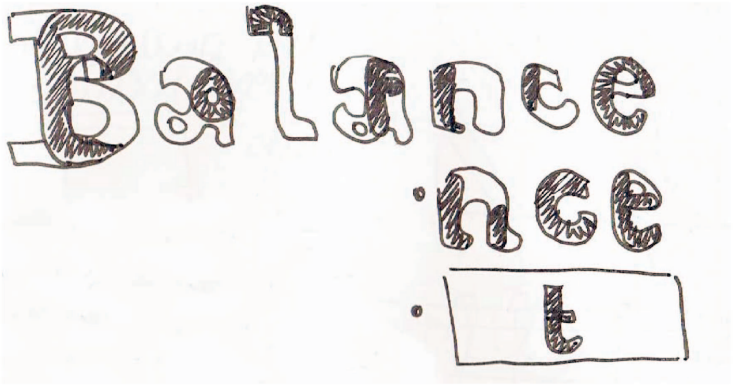


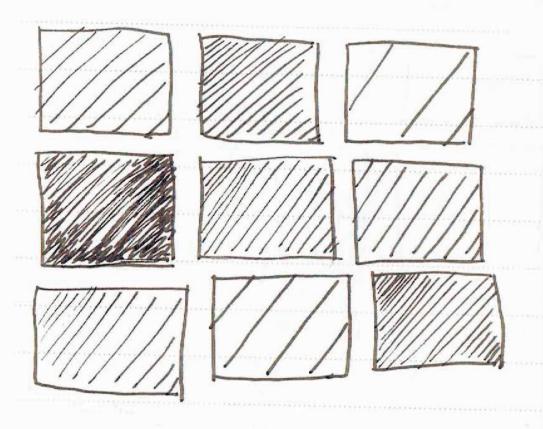


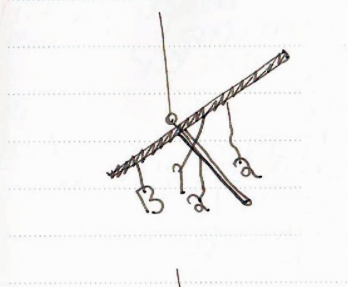

balance

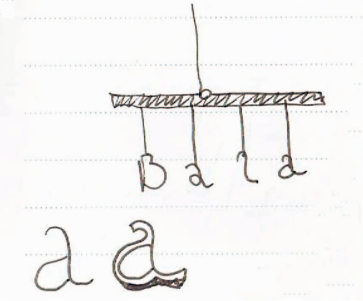


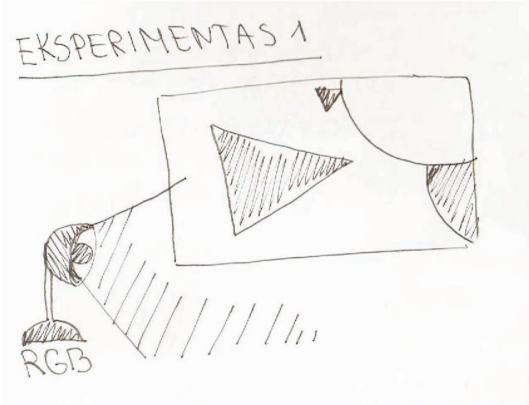

SHADOW GRAPHIC
Balanace
• koncepcija
• video pristatymas
GERAS PRADŽIA
BLOGAS PABAIGA

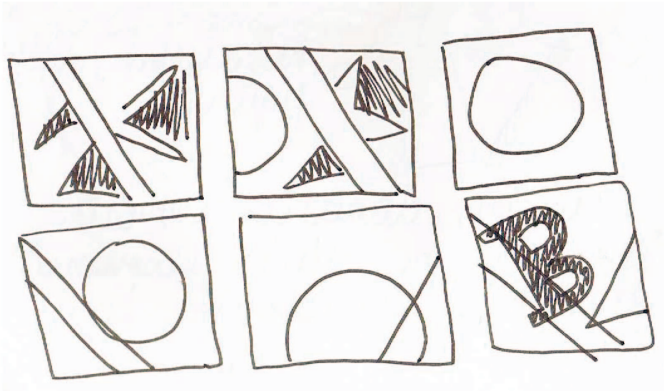

Balance
nce
t

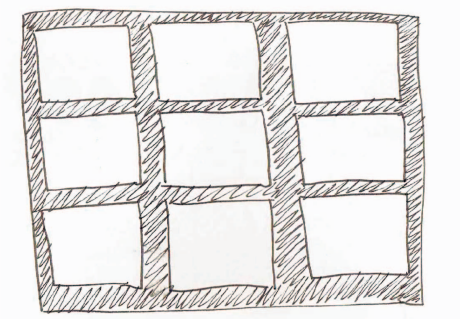


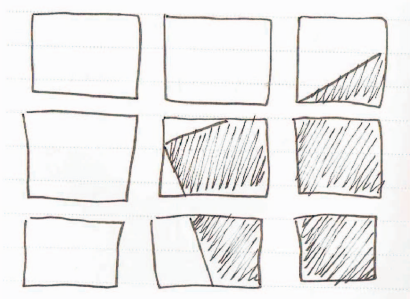


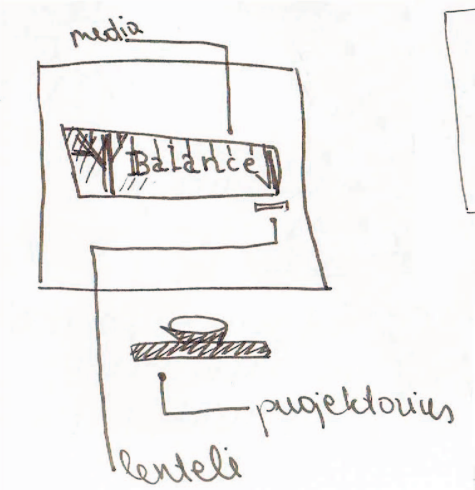


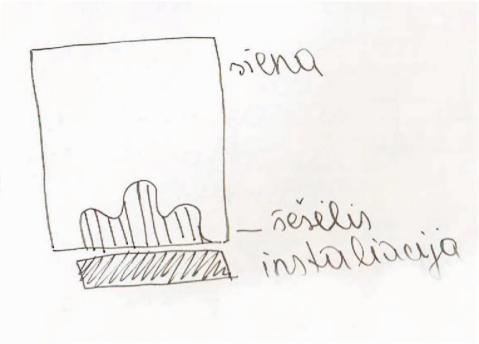

EKSPERIMENTAS 1
RGB

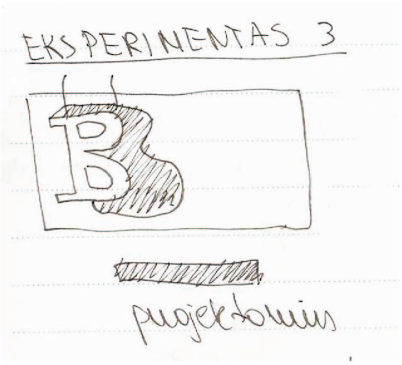


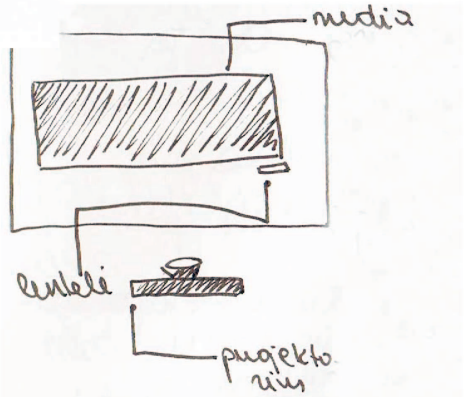


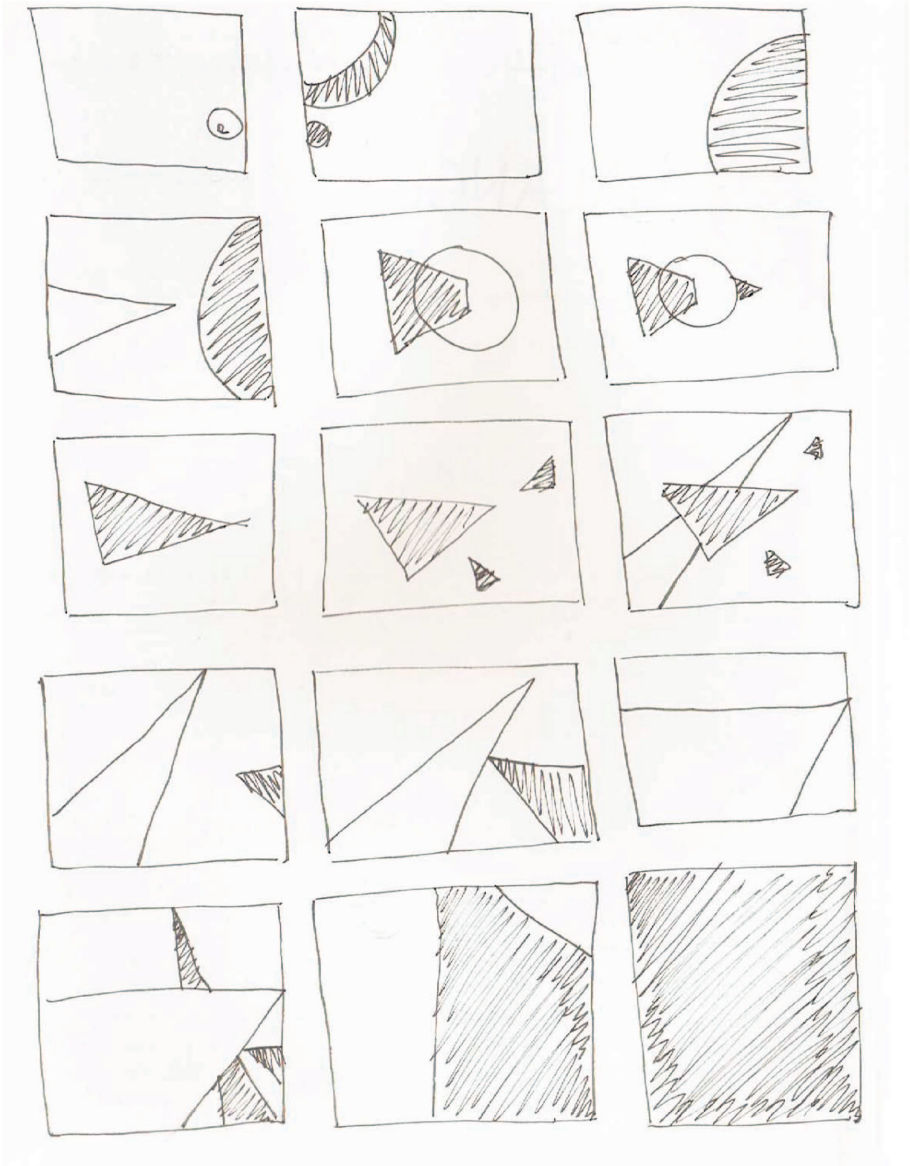


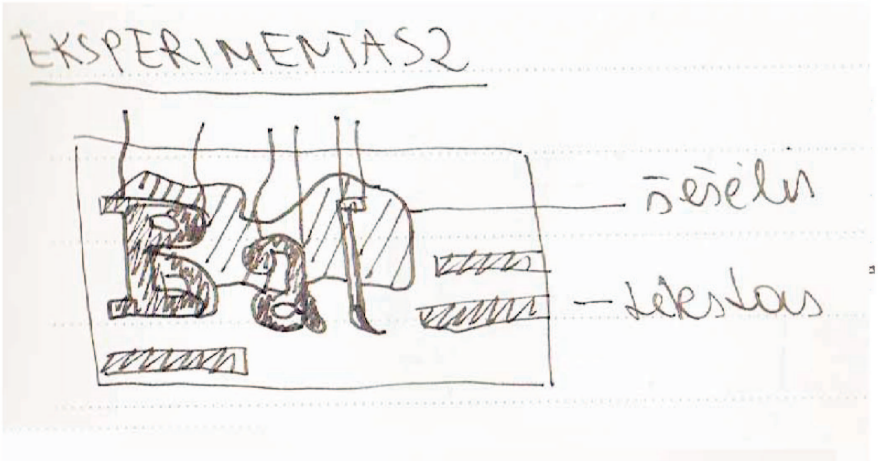

media
Balandė
projektorius
lentelė

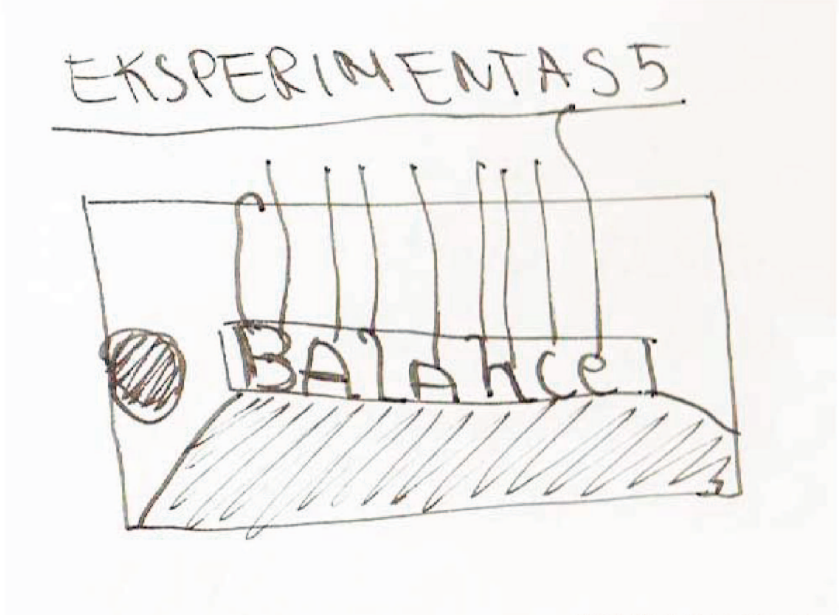

siena
šešėlis
instaliacija


EKSPERIMENTAS 3
projektorius

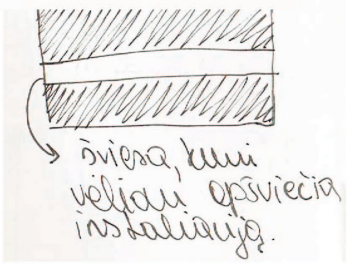

media
lentelė
projekto
rius



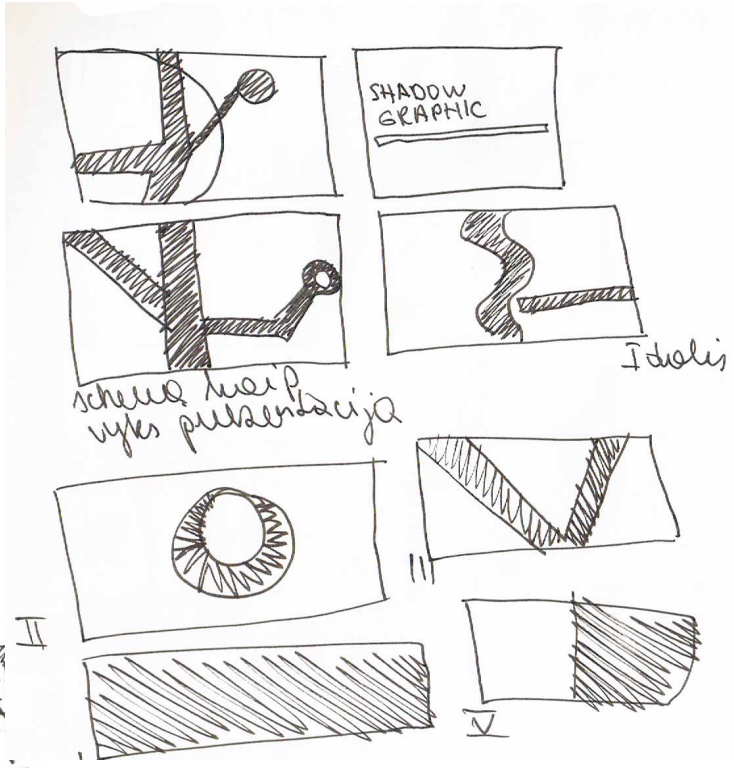

EKSPERIMENTAS2
šešėlis
tekstas

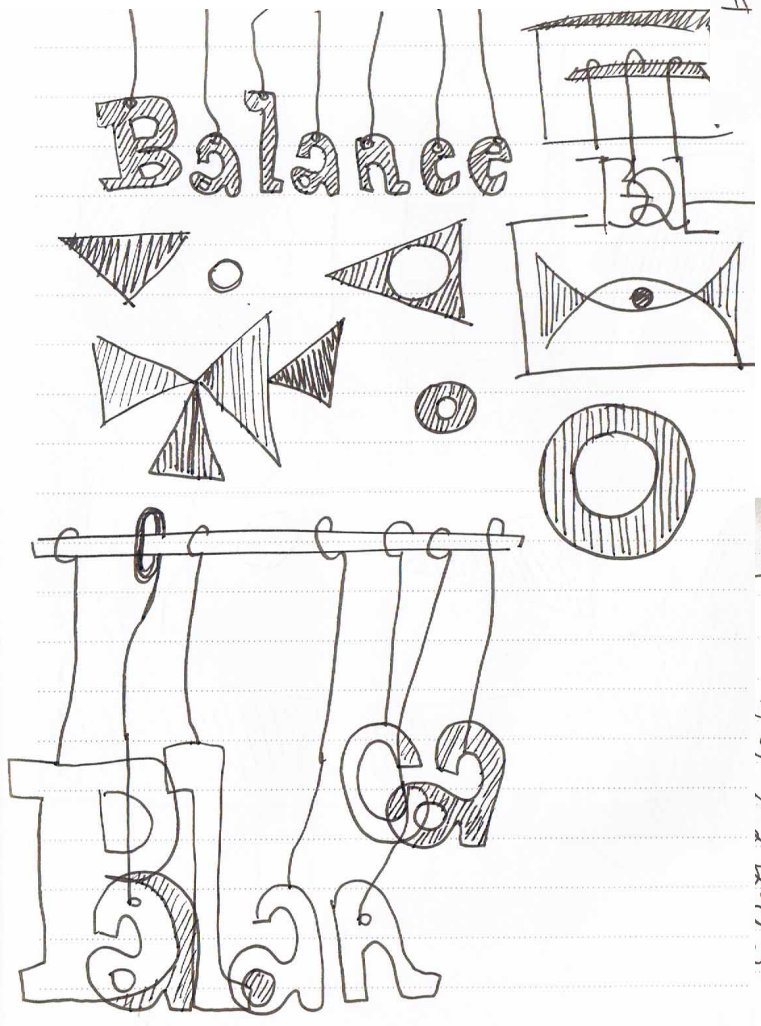

EKSPERIMENTAS 5
BALANCE!

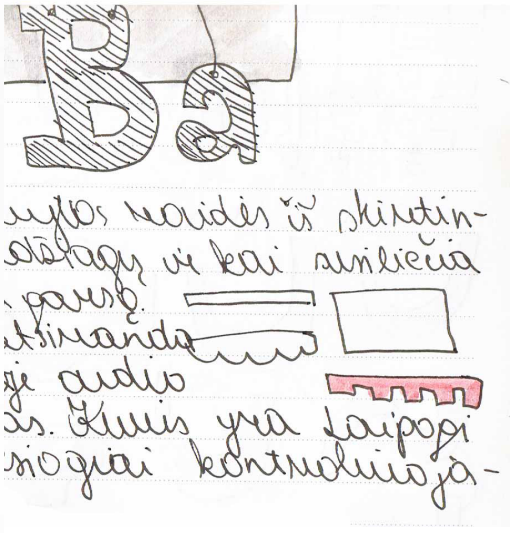

EKSPERIMENTAS 10


šviesa, kuri
veidan apšviečia
instaliaciją.

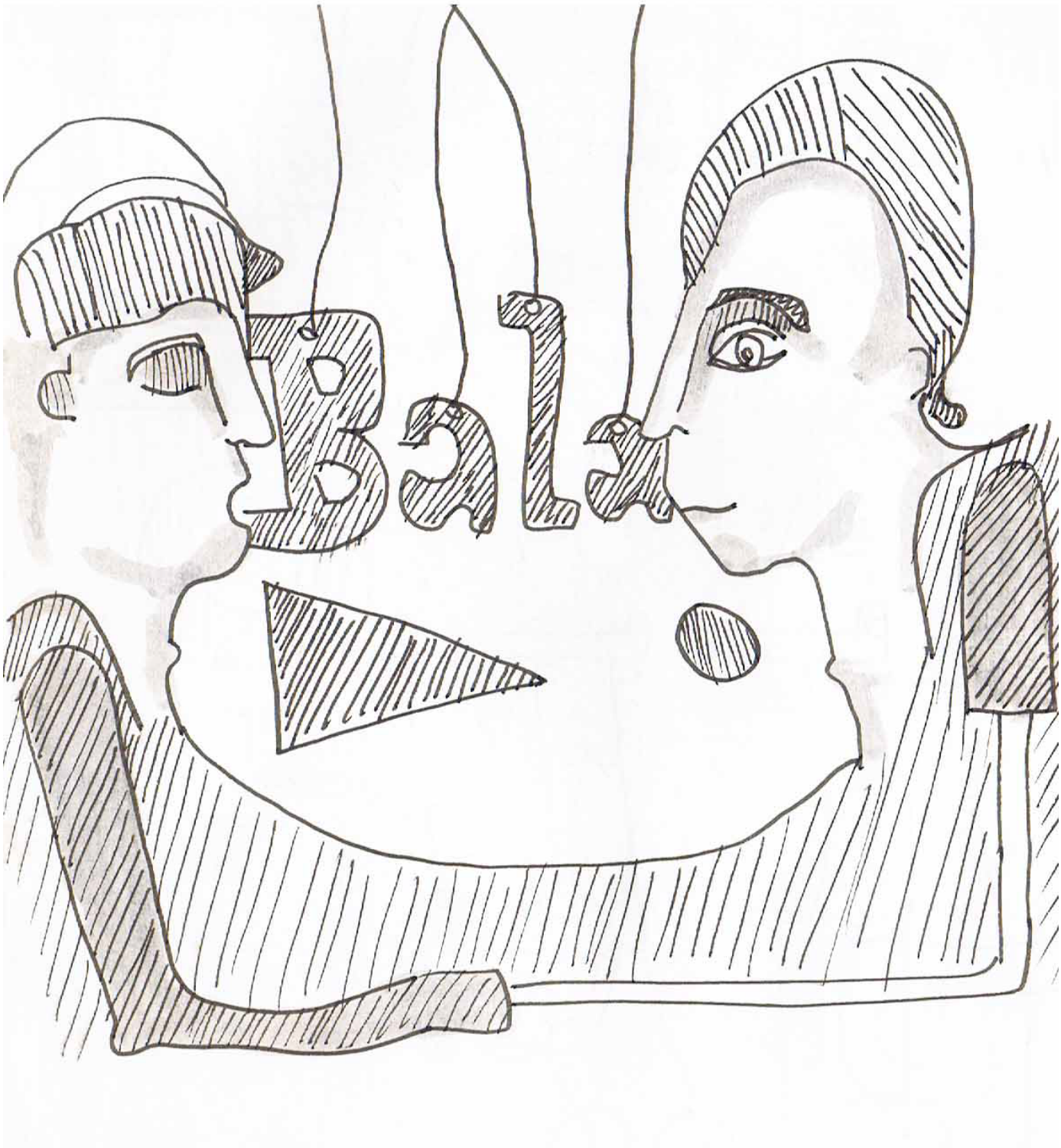

Balance

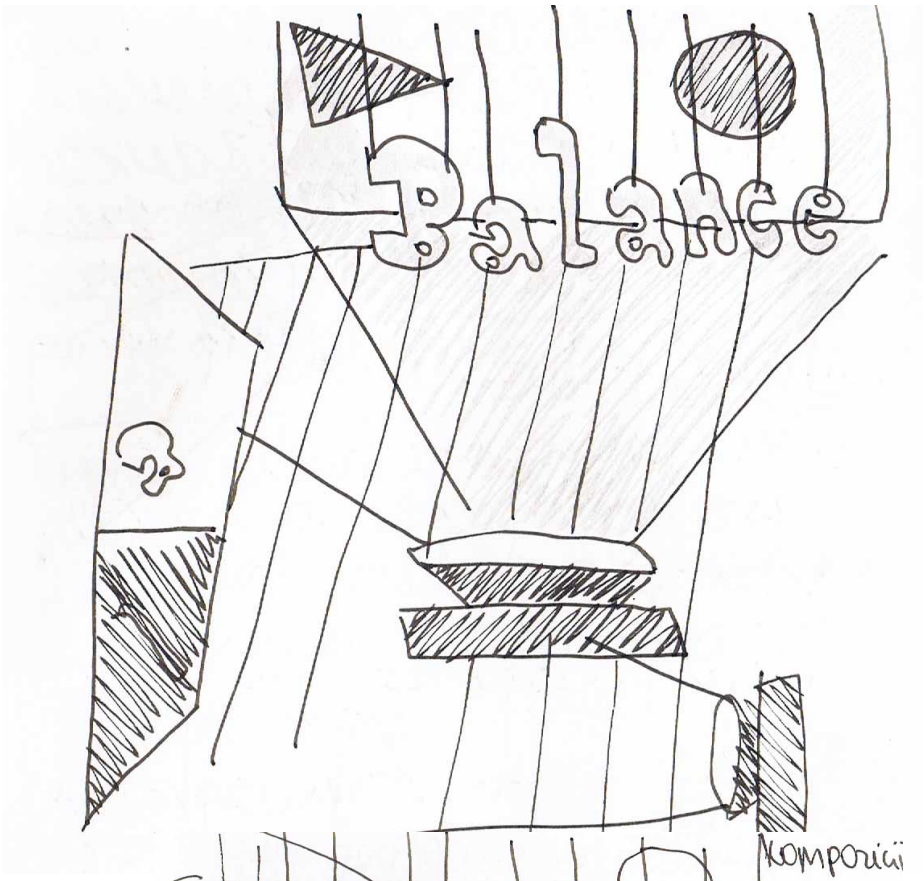

SHADOW
GRAPHIC
I tvolis
II
III
IV


Balance




Balance

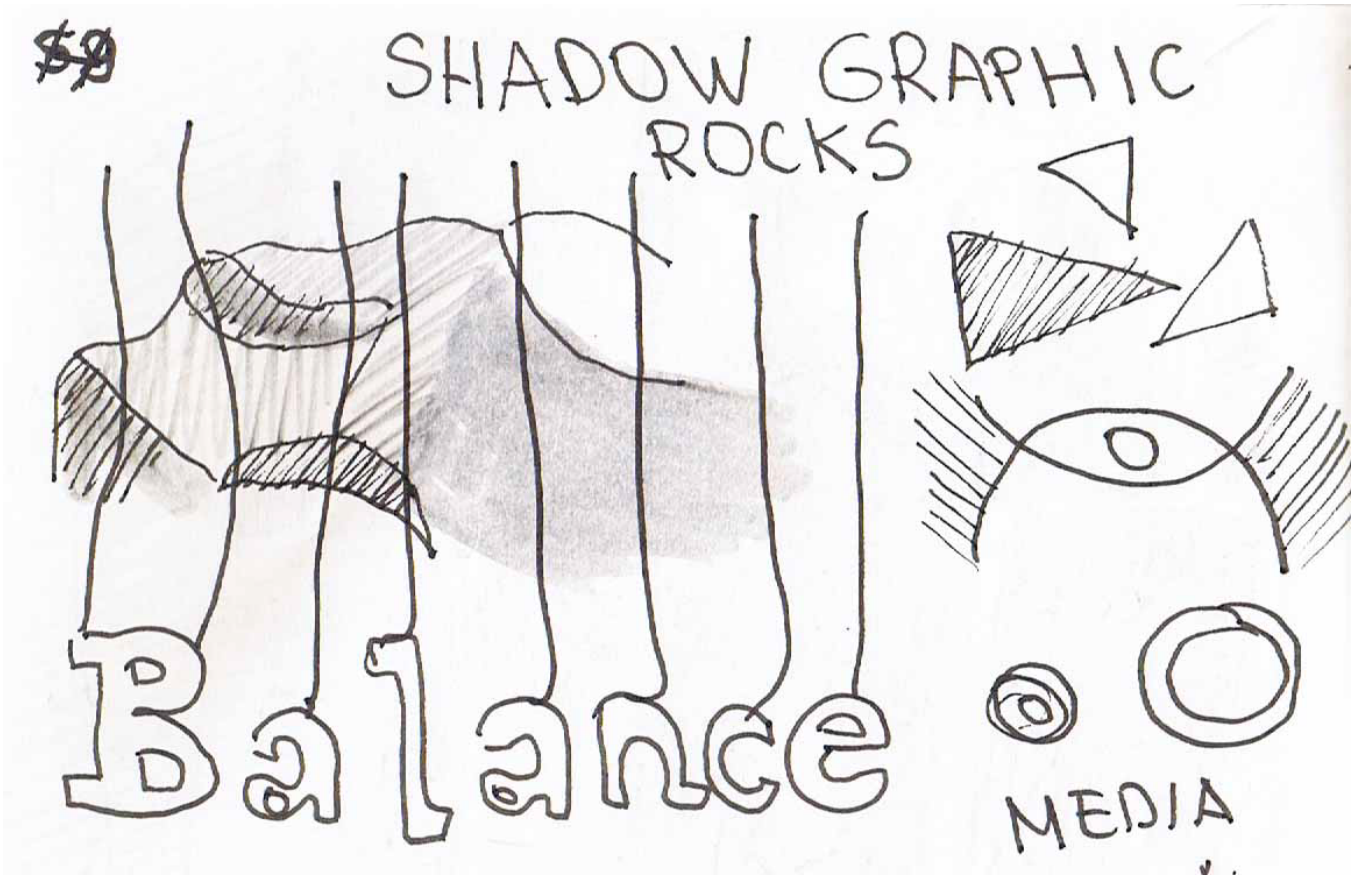

Bala

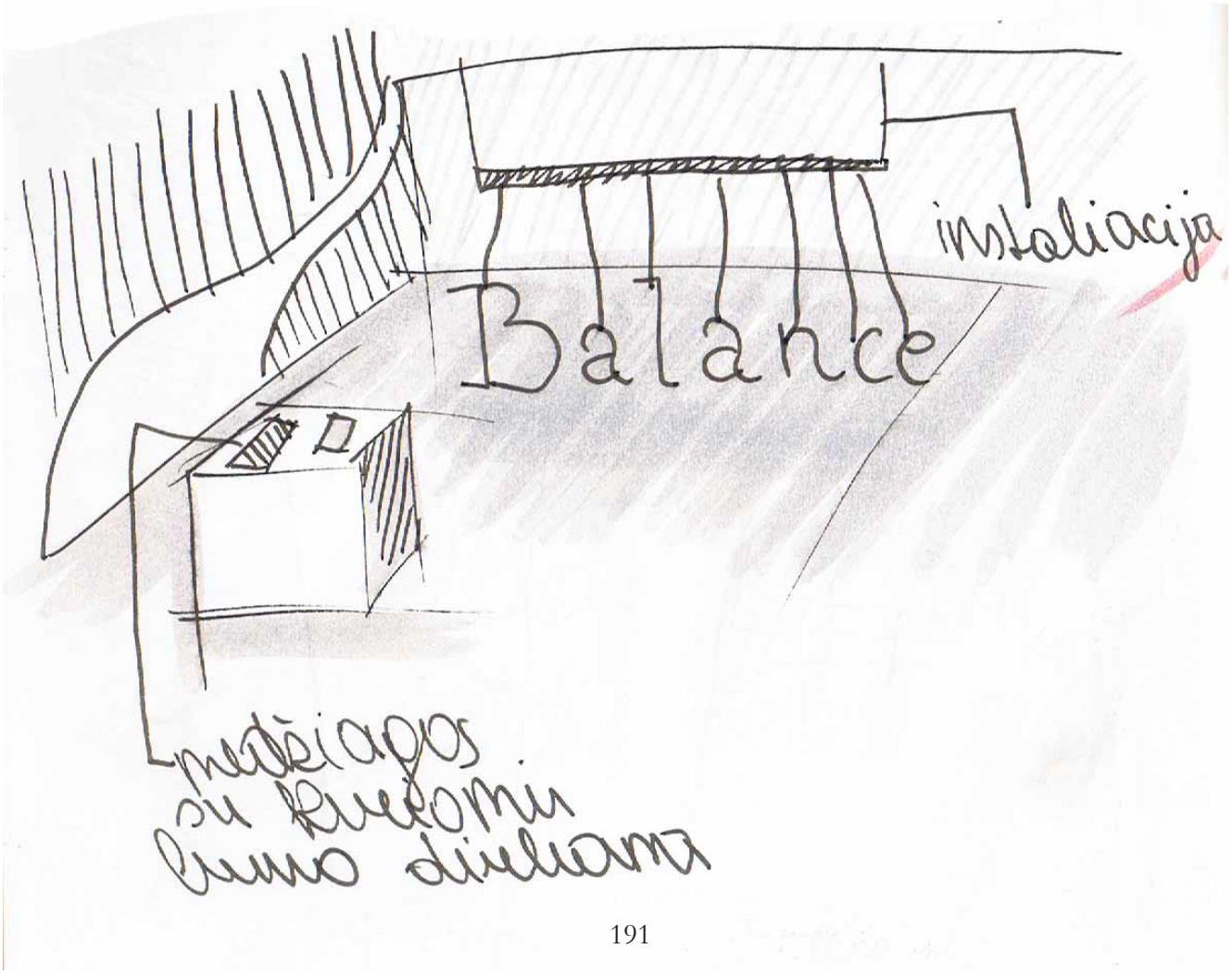


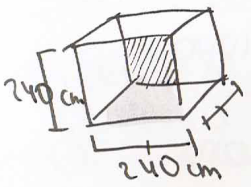
komponuoti

popieriniai
ir pakuotės atmatos
dekoruoja aplinkas
pas ir

Pradinis žodis
balance.
Šiuo atveju
atsispindi tik
dalis žodžio

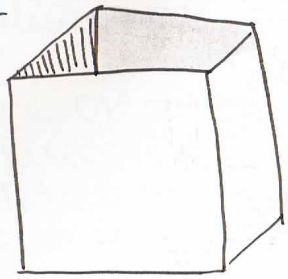

SHADOW GRAPHIC
ROCKS
Balance
MEDIA


instaliacija
Balance
medžiagos
su kvepalu
kuno dirbiama

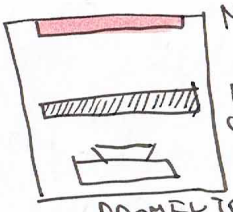


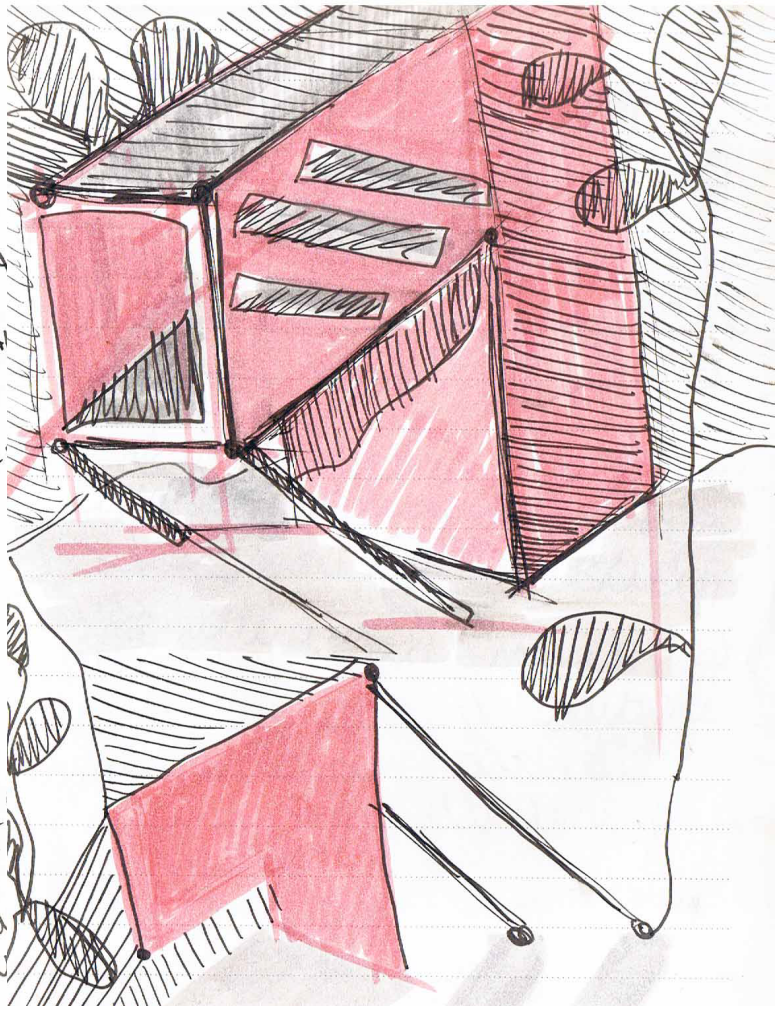
APŠVIETIMAI BEI EKSPONAVIMO BŪDAI BEE POSITIVE

I

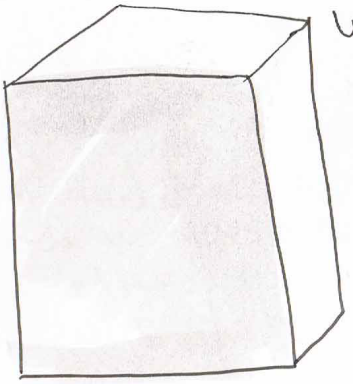


4 sienos be stogo



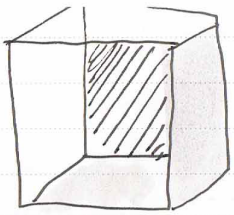


2.H



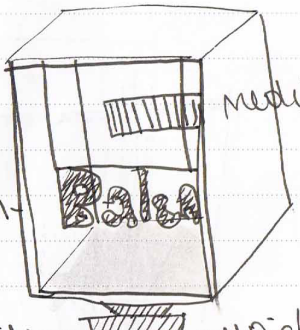
4 sienos su stogu. Viskas taip pat viduje bet mano manymu ~~is~~ jį kaip atnaujinti geriau.

III

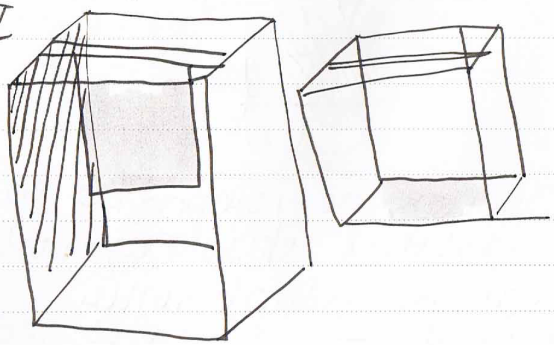


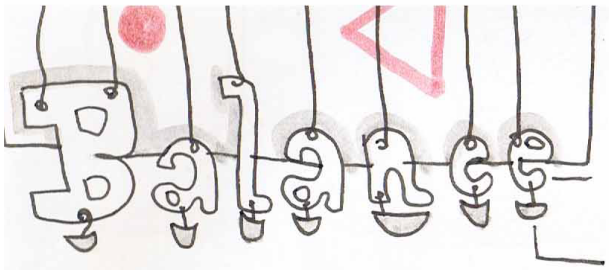
3 sienos su stogu.

Turėtų turėti įėjimą galv. dėmesio objekto. Balance Vietoje šviesos. Viršuje medžiaga, kuri galėtų turėti atnaujinti permainkiai.

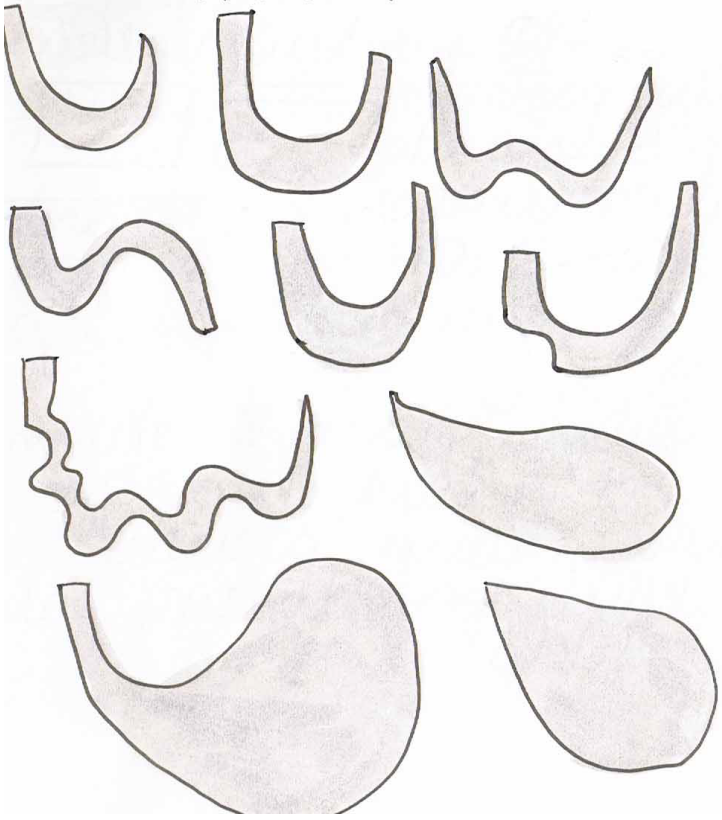


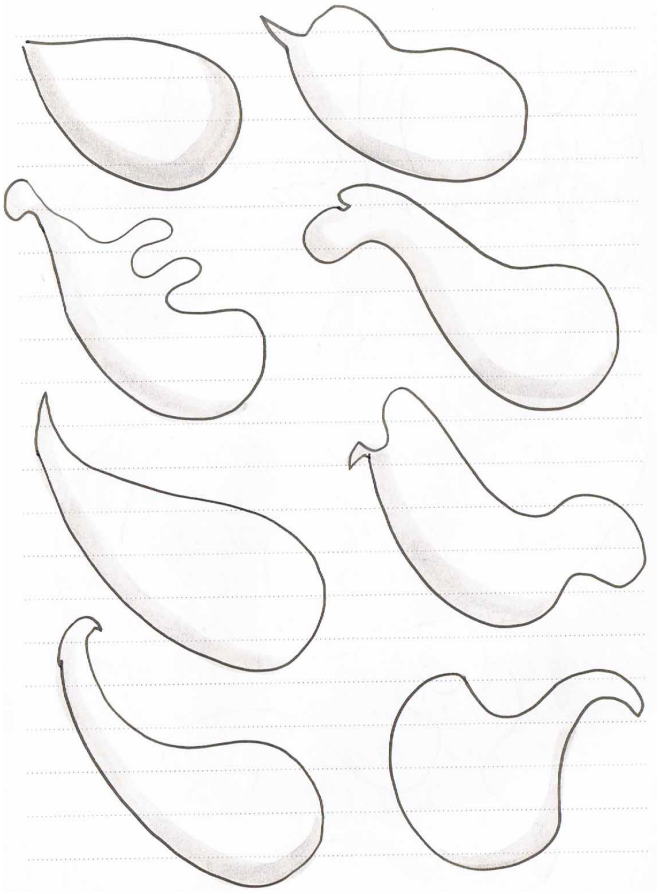
IV

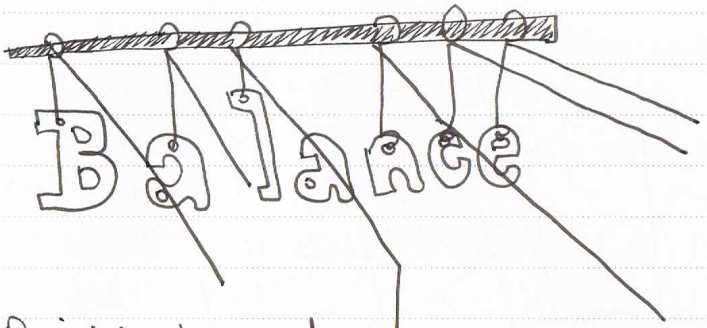




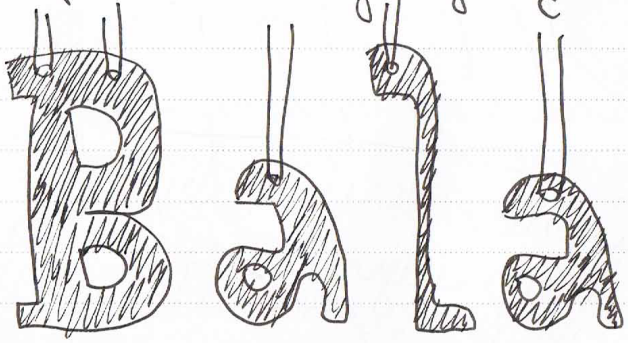
LAŠIUKAI:



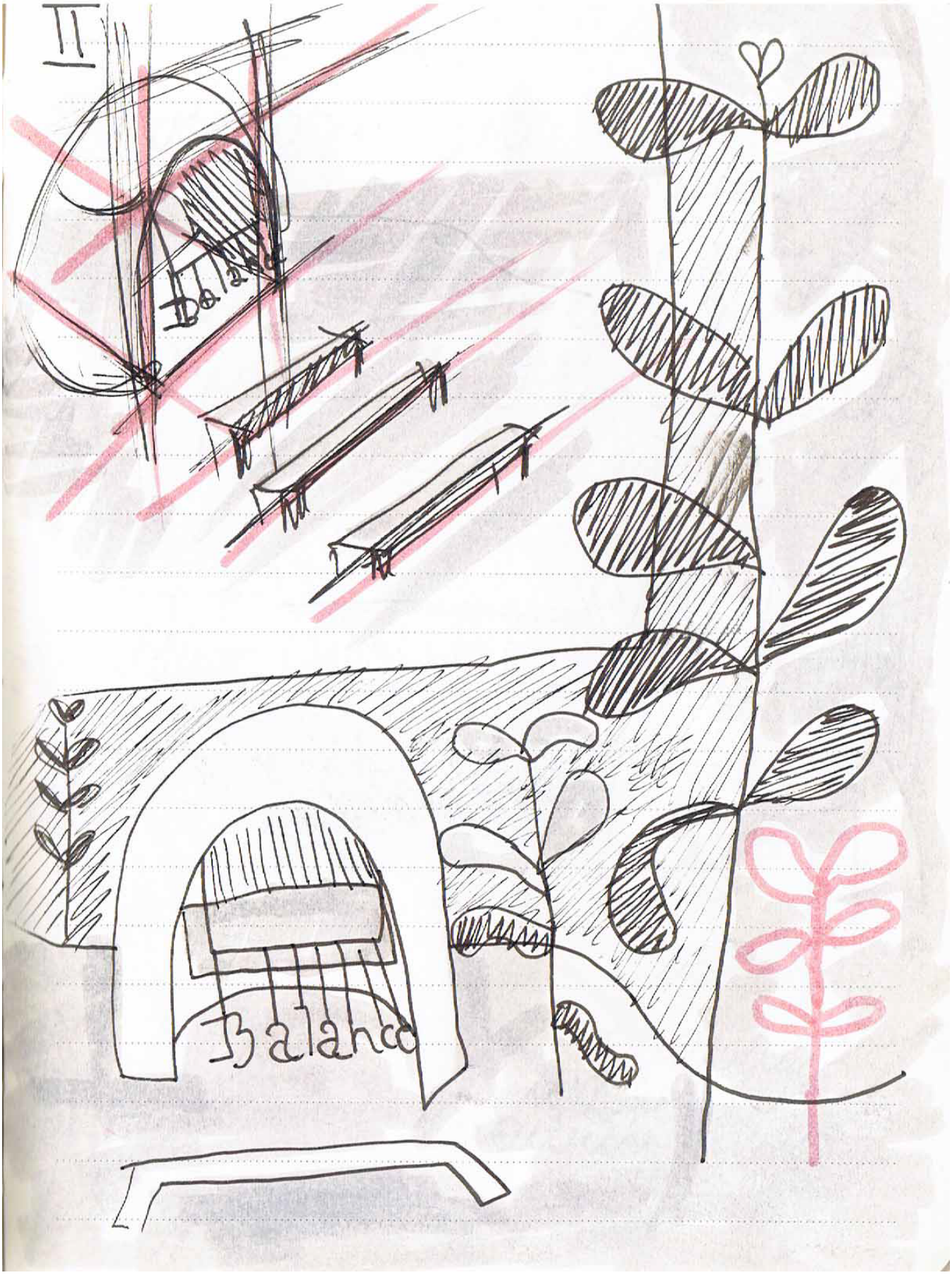




Raidės kuriuose vilnelė ir kaip kailiančios įvairiuose.



Su vėjeliu pučiamos raidės


II
Balanço
Balanço